Contribution to Indian Ethnobotany

Editor
S.K. JAIN

The Book

Ethnobotany has become a well established multidisciplinary subject. It deals with the total direct relationship between plants and man, man of the past, present and even of the future. It is much more than economic botany.

Apart from the multifarious academic aspects of role of plants in ethnography, linguistics, epics, culture, fine arts, sculpture and mythology, ethnobotany has relevance in many topical economicand social problems. Ethnobotany provides data on many endemic uses of plants as known to small ethnic groups, e.g. in medicine, foodand other material culture.

It provides material on genetic diversity in land races still patronised by many rural societies.

Ethnobotany leads us to symbolic relationships like the faith, taboos, worship and several other magico-religious aspects, which in turn provide clues to aspects of conservation and sustained development.

The present book contains 30 chapters written by scientists very familiar with the ethnic groups and the regions of their study. Almost every region of India densely populated by tribals and every major tribe is covered in the book. Thus the book will provide a good glimpse of the rich ethno-botanical heritage of India.

Organised ethnobotanical research is young in India. This subject has been included in the syllabus of many universities. Many chapters in the book provide information and guidelines for field work, interviews with informants, scrutiny of data, and even on role of ethnobotanical data in utilisation and sustainable development of biological resources.

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Contributions to
Ethnobotany of India

Editor
S K. JAIN
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FOREWORD

During the last half century, ethnobotany has more and more been recognized as a valid discipline that can play a very material role in the advancement of many aspects of scientific, sociological and historical studies. An increasing number of investigators have been devoting attention to the vast store of knowledge of plant properties and uses still intact in native cultures in several parts of the world. And notwithstanding the rapid acculturation and consequent loss of plant lore in many areas, there remains much to be done before this abundance of knowledge shall be forever entombed with the cultures that gave it birth.

The Indian subcontinent represents without a doubt one of the greatest emporia of ethnobotanical wealth. Here, many living groups of peoples, still more or less isolated from the influences of the modern world, and who continue to live in close association and vital dependence on their ambient vegetation, provide scientists with unparalleled opportunities for profound research. But this vast region has other characteristics which make ethnobotanical research highly profitable from both the academic and practical points of view. It supports a most varied and rich flora—from the driest of deserts to tropical rain forests—and an extraordinary diversity of altitudes from sea level to the highest mountains in the world. And perhaps of even deeper significance, this region possesses in the vedas and a variety of other documents an ethnobotanical continuum that enables the contemporary investigator to delve into the distant past and often to link modern folk lore directly with that of ancient peoples and cultures. There are few areas that can offer such a unique combination of situations and circumstances. Consequently, there are few areas that can so auspiciously encourage ethnobotanical research.

The resurgence of interest and activity in ethnobotanical studies amongst Indian scientists is heartening. The pre-occupation of Indian scientists and historians of many persuasions

with the furtherance of original ethnobotanical research has not gone unnoticed in the world of science. The impetus which such research has acquired, thanks mainly to the foresight and dedication of Indian institutions and individuals, has served to stimulate similar investigations in distant regions. It has been vitally evident in India's scientific program and has had a direct effect on the rise of India's scientific resurgence which has been marked and constant, especially since the days of independence. The world of ethnobotany prays that it may continue in ever deepening intensity in the future—and there is every indication that it will so continue.

As an ethnobotanist whose activities have been centered primarily in tropical America, I am perhaps better able to appreciate the contributions being made in the Indian subcontinent than those investigators closer to the scene. For this reason, I am happy indeed to accept Dr. S.K. Jain's invitation to prepare this brief foreword to what promises to be another milestone in ethnobotanical literature. And it is particularly gratifying to me because it gives me an opportunity of greeting my Indian colleagues and of offering them my heartiest congratulations and wishes for an ever more brilliant future for ethnobotanical research in India.

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1989

PREFACE

Ethnobotany deals with the direct, traditional and natural relationship between human societies and plants. It has been recognised as a multi-disciplinary science comprising many interesting and useful aspects of plant sciences, history, anthropology, culture and literature. Its importance has been realised chiefly in respect of the varied economic uses of plants among the primitive human societies. It brings to light numerous little known or unknown uses of plants, some of which have potential of wider usage. It has relevance also in conservation of genetic resources.

India is very rich in ethnobotanical information. About 80 percent of India's population lives in villages, and a considerable proportion comprises tribals living in remote forest areas. The population of several districts in Central and eastern India is predominantly tribal. The different traditions, beliefs, needs and cultures of the various tribes and the diversity of flora in India richly contributes to plant folklore.

Though organised study or research in ethnobotany is recent, many earlier publications contain valuable material of ethnobotanical importance. Ethnologies on tribes living in different parts of the world, works on indigenous medicine and botany, and sometimes even forestry and travel accounts contain data of ethnobotanical significance.

The recent interest in such organised studies can be said to have originated in the Botanical Survey of India, with the work of Dr. E.K. Janaki Ammal in the middle of this century. Her work and the publications of Prof. R.E. Schultes of Harvard University, Dr. P.J. Faulks of Aberdeen University and Dr. Barrau of Natural History Museum, Paris particularly inspired workers in India.

The Editor of the present volume made efforts to intensify the research programmes initiated by Dr. Janaki Ammal and

also to activise the interest in the subject among other scientists and institutes. Studies on Ethnobotany are now being undertaken in several research and educational institutes.

Ethnobotany is now taught in many Indian universities in degree and postgraduate classes, is a topic of special paper and Ph. D. dissertations, as also a part of syllabus in several public service examinations.

Special Sessions on ethnobotany were organised in 1978, 1983 and 1988 during the Xth, XI and XII International Congresses on Anthropological and Ethnological Sciences, and the Botanical Conferences held at Calicut and Meerut, etc. It was felt that it would be useful to bring together some of the important material presented during those sessions for wider circulation and evaluation of our present interest and activities in ethnobotany.

Till 1981, there was no book under the title of Ethnobotany as such. *Glimpses of Indian Ethnobotany* (1981), *A Bibliography of Ethnobotany* (1984) and a *A Manual of Ethnobotany* (1987) were the pioneering works. *Glimpses* went out of stock and there were demands for its revised version.

The present volume contains 30 articles by 32 ethnobotanists. Several of these are abridged, enlarged or otherwise revised versions of the papers presented in conferences mentioned above and/or published in *Glimpses* and some specially invited articles. The main purpose of this publication is to familiarise the readers with some major areas of studies already in hand and to indicate the gaps in our knowledge of Indian Ethnobotany by regions, by tribes or by special subjects. For example, a paper on sacred groves of one region indicates the possibility of similar studies in other areas, or a paper on one crop plant suggests scope of work on other economic plants or among other tribes and locations.

The articles in the book are so arranged as to provide a coherent evolution of the subject, starting with an article on concepts, methods and application of ethnobotany, a few articles on plants in folk religion, mythology, literature and life,

through several (from western Himalaya through plains of central India to eastern India, penisular India and the Andaman & Nicobar islands) regional studies—some general and a few specifically on medicine or food—a few articles on special approaches like plants as masticatories, in veterinary medicine, or shapes of monuments and relation of ethnobotany with aspects of conservation of cultural heritage and forest cover.

In order to fix the identity of plants referred in various papers, scientific names of plants have been used along with their local names whereever available.

As far as possible, the correct and currently accepted botanical names have been used. At some places, however, the change from the old name to the current name either involved too many changes in the alphabetical sequence of the species in text and tables or involved some element of doubt in taxonomy or identity; in such cases, old names have been retained.

A list of some important name changes relevant to this book is given as an appendix.

Where species of ethnobotanical importance are enumerated, the descriptions of plants of their uses are provided in shortened language. The botanical names as well as the local names are given in italics.

The language of the local names, whereever known, is given in brackets after the local name.

Grateful thanks are due to:

Professor R.E. Schultes, Emeritus Director, Botanical Museum and Professor of Natural Sciences, Harvard University, USA, for discussions and advice on many matters relating to Indian ethnobotany, and for giving a Foreword to this work;

The Presidents of the Xth, XI and XII International Congresses on Anthropological and Ethnological Sciences and the All India Botanical Conferences for facilitating discussions on ethnobotany during those Conferences, and use of some material in this volume;

Authors of all the papers for contributing the articles and for readily agreeing to the various suggestions of the Editor;

Messers R.L. Mitra, A.A. Ansari, K.K. Khanna, V. Mudgal, Ved Prakash and A. Mehrotra for assistance in checking the nomenclature, and to Smt. Suruchi Saxena for typing some part of the manuscript.

Thanks are due to the Council of Scientific and Industrial Research, New Delhi and to Dr. P.V. Sane, Director, National Botanical Research Institute for granting me facilities of work at the NBRI, after retirement from the Botanical Survey of India.

The objective of this publication will be fulfilled if it stimulates more individuals and institutions in India to take up ethnobotanical studies, and the rich Indian plant folklore receives deeper understanding and appreciation by scholars of other disciplines.

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1

ETHNOBOTANY IN INDIA: RETROSPECT AND PROSPECT

S.K. Jain[1] & R. Mitra[2]

ABSTRACT

Ethnobotanical knowledge is very ancient in India. Even recorded ethnobotany of India might well be among the earliest in the world, and all traditional systems of medicine had their roots in ethnobotany.

Yet, organised studies in ethnobotany are very recent. During last about 30 years, studies have proceeded along various lines, such as the ethnobotany of specific tribes, of certain regions, of particular plant groups or diseases and along various other miscellaneous sub-or inter-disciplinary approaches.

The article gives a review of significant Indian researches. References have been made to some of those international studies which have prompted Indian researchers into this field, or influenced their work.

The importance of faith in utilisation of knowledge and resources is also discussed. The relevance of ethnobotany to problems of health care, food, agricultural improvement, conservation of genetic resources and to economic welfare of the tribals is emphasized.

Introduction

Ethnobotany can be defined as the total natural and traditional relationship and the interactions between man and his surrounding plant wealth. Ethnobiology must have been the first knowledge which the early man had acquired by sheer necessity, intuition, observation and experimentation.

Archeological or palaeobotanical evidences about collection, use and cultivation of any plant products by early man for food,

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house-building, etc. (Van Zeist and Casparie, 1983) and references to herbal medicines in ancient scriptures suggest a very long history of ethnobotany. Yet, the word ETHNOBOTANY was applied to such knowledge by Harshberger (1895) less than a century ago, and till a few years ago the only book on the subject was *Introduction to Ethnobotany* by Faulks (1958).

The term ethnobotany should rightly be applied to natural and direct relationship with plants of any people, at any level of antiquity, primitiveness or acculturation, and even to the most sophisticated of gentlemen and women if the latter associate only particular plants with festivals or offer flowers or fruits to their Gods or deities. Recall the Paradise flower, Plants of Bible, worship of Basil (Tulsi) or Lakshmi, the Goddess of prosperity on Lotus. Yet, ethnobotany is generally taken as the science of relationships of only the primitive or aboriginal people with plants.

There are altogether 427 tribal communities all over India. According to 1981 census, Scheduled Tribes population in the country was 53.8 million, constituting about 7.5% of the total population. It is estimated that the predominant areas comprise of about 15% of the total geographical area of the country (Gupta, 1987).

The recent re-discovery of the remarkable medicinal properties of certain plants like species of *Rauvolfia*, *Ephedra*, *Panax*, *Podophyllum* and *Cammiphora*, gave new impetus to ethnobotany, and during last three decades several hundred papers have been published on ethnobotany, but mainly on folk-medicine.

The term ethnobotany has often been considered synonymous with traditional medicine or with economic botany.

The scope, concepts and implications of ethnobotany have been expanding at a very fast rate (Schultes, 1962, 1963; Ford, 1978; Jain, 1967, 1986, 1987a, b, 1989).

Ethnobotanical studies on various subgroups of the plant kingdom, like on algae, fungi, bryophytes, pteridophytes, lichens, etc. are subdisciplines and have been named as ethnoalgology, ethnomycology, ethnobryology, ethnopteridology, ethnolichenology, etc. Studies on special aspects of botany, like systems of classification, medicinal uses, palaeobotany ecology, etymology of plant names, etc. are also subdisciplines

and have been termed as ethnotaxonomy, ethnomedicobotany, ethnoecology, palaeoethnobotany, etc.

But, when the inquiry in ethnobotany extends beyond ordinary realm of botany and has significant input of another branch of science, like archaeology, or medicine, the work becomes interdisciplinary. More and more new lines of interdisciplinary researches are emerging under specialized titles like ethnopharmacology, ethnomedicine, ethnogynaecology, ethnopaediatrics, ethnoagriculture, ethnobiology, ethnotoxicology, ethnonarcotics, archaeoethnobotany, ethnomusicology, etc. and separate journals devoted to some of these subjects are now in circulation. Very distinct demaracation between the scope of related interdisciplinary subjects is not always possible, and in fact exhaustive monographs on some plants like on *Poppy* (Merlin, 1984) or *Amanita* (Wasson, 1969) include many disciplines and concepts.

Historical

Majumdar (1938) wrote a book of the title *Some Aspects of Indian Civilisation* (in plant perspective). An advertisement of this book in *Bulletin of Botanical Society of Bengal* (quite unusually) added a sub-title '*Ethnobotanical Studies in India*', even though such a line does not appear on the original work.

Systematic field and related studies in the subject were steered/pioneered by Botanical Survey of India.

E.K. Janaki Ammal studied subsistence food plants of certain tribals of south India. Faulks (1958) almost deals with whole economic botany. Researches of Schultes (1962, 1963) in Amazon and Barrau (1959, 1966) and Conklin (1962) in Melanesia and S.E. Asia greatly prompted Indian workers into Ethnobotany.

Jain (1981) undertook intensive field study among the tribals of Central India, and also devised methodology for ethnobotany, particularly in the Indian context. The publications from his group in the early sixties triggered ethnobotanical activity in many other centres, particularly among botanists, anthropologists and ayurvedic medical practitioners. During the last two decades, work has been initiated at, *interalia*, National Botanical Research Institute (NBRI), Lucknow, National Bureau of Plant Genetic Resources

(NBPGR), Delhi, Central Institute of Medicinal and Aromatic Plants (CIMAP), Central Council for Research in Ayurveda and Siddha (CCRAS) and Central Council for Research in Unani Medicine (CCRUM).

Several Botany Departments of Universities like Mysore, Kashmir, Bhubaneshwar, Jabalpur, Calicut, Garhwal, Jodhpur, Jaipur and Shillong have not only included Ethnobotany in their syllabus but also raised its status as special paper. Several doctoral theses have been prepared in the Universities at Gauhati, Rajasthan, Calcutta, Bombay, etc.

In addition, Indian Folklore Society, Calcutta, Kerala Folklore Academy, Trichur and Department of Folklore Research, Gauhati University have done noteworthy contribution in the field of Ethnobotany.

An All India Coordinated Research Project on Ethnobiology was conceived in 1974. It took some years to finalise the work programme and the project came into operation from 1982, at NBRI Lucknow, four centres of Botanical Survey of India (Shillong, Howrah, Coimbatore and Port Blair) and some other institutions.

Progress

Ethnobotanical work in India falls in following major categories (these are by no means exhaustive).

(a) Ethnobotany of certain ethnically distinct primitive or otherwise interesting human societies, e.g. on the Mikir of Assam by Jain and Borthakur (1983), on Bhils of Rajasthan by Joshi (1982), on Tharus of Uttar Pradesh by Maheshwari *et al.* (1981), on Bhoxa tribe of Bijnor and Pauri Garhwal (Maheshwari and Singh, 1984).

(b) Ethnobotany of any specific geographical region, which may have one or more distinct ethnic groups, e.g. on Central India by Jain (1963, 1981), on Kumaon by Shah and Joshi (1971), on Lahul in Panjab by Koeltz (1979), on Araku valley in Andhra by Banerjee (1974), on Santhal Pargana by Goel *et al.* (1984), on Mirzapur by Maheshwari *et al.* (1989), northern India by Shah (1982), Balphakram Sanctuary, Meghalaya by Kumar, Haridasan and Rao (1980), Koraput (Orissa), by Paul and Mudgal (1985), Rajasthan by Singh and Pandey (1982), Kashmir by Dar,

1.1 A Karbi young man with single-pan balance.

1.2 Lodha woman making rain-shield from leaves of *Bauhinia vahlii*.

Virjee, Kachroo and Buth (1984), and on Indian desert by Shekhawat and Anand (1984).

(c) Ethnobotany of particular utility groups of plants, like food, medicine, hallucinogens, etc. A few examples are on food by Jain (1964), Bhandari (1974), Arora (1981) and Gaur (1977), and on medicine by Bodding (1925) and Jain (1965).

Further specificity is also seen in some publications, e.g. plants in particular diseases, like papers on ethnogynaecology by Tarafder (1983, 1984), on ethnodermatology by Khan and Chaghatai (1982), on rheumatism by Hemadri (1981), on snakebite and ethnoorthopaedics by Jain (1963, 1967), on contraceptive herbs by Billore and Audichya (1978), on plants used against diarrhoea and dysentery (Sahu, 1982, 1983) and as veterinary medicines (Pal, 1980).

(d) Ethnobotany of a particular plant, genus or family of plants, e.g. on *Bauhinia* (Pl. 1.2) by Jain *et al.* (1973), on *Coptis* by Mudgal and Jain (1980), on *Selaginella* (Pl. 1.5) by Dixit (1982) on *Coix* by Jain and Banerjee (1974); and on *Ficus* by Chattopadhyaya (1976).

(e) Many ethnobotanists have given attention to the diverse tools, appliances, gadgets and articles of personal adornment, which the primitive man has been designing and using since ancient times and even today. Most ethnographers have dealt with them. They aptly prove the dictum 'necessity is the mother of invention'. There are reports of a single-pan balance among the Mikirs of Assam (Pl. 1) a variety of cattle traps among Gonds and Bhils (Jain, 1964; Joshi, 1982; a heat-proof water bottle (Pl. 1.3) among Marias (Jain, 1964), and a large variety of musical instruments (Pl. 1.4) (Parmar, 1978; Jain, 1965); containers and utensils (Jain, 1986); articles of personal adornment (Pl. 1.6) (Mehra *et al.*, 1975); and agricultural tools.

(f) Ethnobotanical aspects of conservation and management of plant resources include studies on preservation of primaeval forests in form of sacred groves (Vartak & Gadgil 1981; Hajra, 1980), of individual species (Sen Gupta, 1965), and of plant genetic diversity (Arora, 1973.

1977; Arora & Nayar, 1984), and of ecological implications of traditional agriculture (Ramakrishnan *et al.*, 1981).

(g) The study of mythological associations or faith in plants among the folk is a fascinating area with immense possibilties of insight into the causes of these associations. Many authors have studied tree worship (Sen Gupta, 1965, Bhatla, Mukherjee and Singh, 1984), plants in offerings (Jain, 1963), plants dipicted on carvings in temples, (Gupta, 1987), plants in Indian epics (Agarwal, 1981; Gupta, 1987) and in witchcraft (Aulakh & Mukherjee, 1984; Mukherjee & Aulakh, 1984).

(h) Another category of publications deals with rather miscellaneous subjects like local names of plants and their etymology (Jain, 1963; Manilal, 1980), taxo-ethnobotanical studies of Rajouri, Jammu (Virjee, Kachroo & Bhat, 1984), folk taxonomy, resource concepts and weather forecast from behaviour of plants (Joshi, 1985).

Special area of work

Alcorn (1981) has recently, raised very relevant question—Why and how only particular plant species out of the several hundred in the vicinity are selected as a resource. Such searching questions can reveal valuable information on knowledge, aptitudes, responses and perceptions of people, as also of the properties of plants. They help in blending resources into development.

In India, such studies should provide valuable data on the large number of plants associated even with our mythology or faith.

Much ethnobotanical work has been directed to study and description of articles of domestic or professional use, including the huts or houses of the adivasis. Researchers have found much ingenuity in design, choice of timber or other materials and in art of making and decorating these articles. Some of the articles of common usage like tobacco pouches, combs and toys have found potential of trade as souvenirs among tourists.

The agricultural practices and other daily chores of the primitive man provide valuable clues of his definite concepts of conservation of plants resources, and energy and healthy environments and one interesting area of work in ethnobotany

is the study of selection brought about by the tribals in certain economic plants, and the conservation of germ plasm through patronage of land races.

Many tribals and other orthodox cultivators have not adopted all new or improved varieties of crops and have continued to grow the traditional (even less productive) land races or wild relatives of commonly cultivated crops, thereby maintaining their genetic material or germplasm. Specific characters of hardiness, disease resistance and adaptability to special conditions like water-logging, extreme drought or cold, etc. in the land races have been continuously utilized by the plant breeders and on some occasions helped averting wide-spread famines. Arora and his associates (1980, 1981, 1984, 1987) have done pioneering work in India and shown infinite opportunities of such work on not only food plants, but all groups of economic plants.

Ethnobotanical studies help in revealing the numerous germplasm stocks of our cultivated plants and vegetables. The tribals living in interior of forests also cultivate numerous vegetable crops and these are in cultivation for generations and thus represent a distinct genetic stock adapted to local conditions. Some examples of such cultivated crops are *Piper peepuloides* used as condiment in Khasi hills, *Pakia roxburghii* grown in country yards for their fruits used as vegetables in northeastern states, *Moghania vestita* of Khasi and Jaintia Hills, mainly grown as a tuber crop, *Hodgsonia heteroclita*, a cucurbit, which is mostly grown by the Mizo tribals for oil seeds and edible kernel; *Digitaria cruciata* var. *esculenta* a minor millet of Khasi Hill and several species of *Alocasia*, *Colocasia*, *Amorphophallus* and *Dioscorea* cultivated *by several* tribes in northeast India.

The study of origin or basis of local or vernacular names of plants is one line of ethnobotanical study. Useful plants, like any other objects, need to be referred frequently and are assigned names. Vernacular or local names naturally vary from one place, language and people to another. The vernacular names serve useful very purpose. They are simple, easy for the local people to pronounce, and quite often have relevant meaning. The history of movement on this earth of several plants and even people has been developed on the

basis of age, etymology and movement of vernacular names of plants.

The sacred forest and trees of India have not yet been studied to the extent needed and this is yet another aspect of work for active field botanists. Closer analysis is necessary of the ecological impacts of these traditions in different locations. All kinds of mythological associations with plants like plants associated with different planets, or deities or salvation of sages, origin of certain plants from the bodies of gods or deities, plants as abode of souls or spirits, taboos on sowing, plucking flowers or fruits, cutting, eating wild fruits in certain seasons offering to gods, woods suitable (or unsuitable) for making idols of Gods, plants to drive away 'evil eye', etc. need to be recorded and analysed.

Search of new contraceptives

Concern about the increasing population, particularly in many developing countries, directed research into traditional methods of contraception and ethnobotanical data. Many plants were found to be employed for such purpose.

Kamboj (1982) reviewed the work on plants for fertility regulation in India.

Wild plant foods

Many naturally growing or wild plants still supply food to large sections of human beings. Though statistics are not available on the number or percentage of people depending wholly or partially on such diet or the quantities consumed, there is no doubt that, particularly in remote mountains or desertic regions and among unaculturated human societies, wild plant products (tubers, leaves, flowers, fruits, seeds, grains, etc.) do provide considerable quantities of food (Barrau, 1959).

Jain (1965) and Arora (1981) enumerated species used by tribals in certain regions of India.

Magico-religious beliefs

Along with material culture like food, medicine and shelter, plants have been closely associated also with many social customs and mythological rituals of man. Many flowers, fruits or whole plants have been used for offering in worship, and

some plants are themselves worshipped or considered sacred, e g. the Sacred Basil (*Ocimum* sp.), Pipal (*Ficus* sp.). Some plants are believed to possess magical properties, e.g. placing a twig of *Achyranthes aspera* in hairdo of a woman can facilitate child-birth; paste of flowers of *Ageratum conyzoides* on forehead means good luck and success (Jain, 1963).

The 'Dub' grass (*Cynodon dactylon*) is the commonest ground cover in lawns, roadsides and waste places in tropical regions; in India it is one of the essential items on many social ceremonies, worship and rituals.

Many Hindus grow a few plants of Basil (*Ocimum sanctum*) in their house and some worship it. The practice is useful as a few leaves are always handy for curing common cold, sore throat and cough.

The identity of many plants referred in the ancient Indian epics like Ramayan and Mahabharata and in Bible has been established (Agrawal, 1981).

We now have some glimpse of the vastness of ethnobotany. The reasons for these more and more wide horizons of ethnobotany are primarily three. The origin and soul of this subject are in primary basic human needs, in tradition and in faith, things, which are immortal and infinite. Secondly, the body and substance of this science are in plant resources—plants which sustain all life on this earth, and are a renewable resource. Thirdly, and most significantly, the subject has close historical implications with our past, relation with so many facets of our present thought, responses, needs and actions, and relevance also with our future welfare and environments—like needs of new foods and medicines, and conservation of genetic diversity or ecosystems.

Relevance of ethnobotany

Due to its interdisciplinary nature and socio-economic impacts, the linkages of ethnobotany have proliferated and relevance has been established with problems of nutrition, life support species, rural health, drug use and abuse, social customs, cottage industries, economic uplift, conservation of ecosystems and energy, etc.

A close look at the current ethnobotanical work shows that there is a clear shift from descriptive to analytical studies.

Publications on inventories of folk uses of plants or on ethnographic accounts with focus on plant resources and their uses continue to be seen, particularly from botanically underexplored regions such as in several developing countries.

The approach, however, has so far been mainly to see the tribal or primitive man as an explorer of unknown uses. The aspect of conservation or balanced use of resources by early man, which existed in abundant measure, but was not adequately observed, understood and appreciated, is now receiving attention and emphasis.

The impact of ethnobotany in conservation of natural resources is very direct. On the one hand it relates to the beliefs, taboos, avoidances and other constructive approaches of the primitive people, on the other hand cultivation practices of some primitive people adversely effect the environment. By and large, the primitive people have preserved forests as sacred groves or through other mythological associations. Hence, even today, the message of conservation can be brought to many primitive societies through faith and tradition rather than in terms of loss of biomass. Extension work on these lines has much potential.

Discretion in choice of species to be consumed, time of collection or exploitation, the control exercised through taboos, and avoidances, conservation or manipulation of species and habitats through faith, aspects of food safety in the processing of wild foods for making them free from acrid contents, i.e. harmless and palatable, their preservation, mode of cooking for saving energy are newer areas of observation.

A useful recent approach is to look at this man-plan relationship from the view point of the plants own populations, i.e. selective exploitation, reproductive biology, species competition and consequently survival (ethnoecology).

Plant breeders have been utilizing land races and wild crop relatives in hybridisation programmes. They will need germ plasm of land races and data on wild relatives of all crop plants. The lines of research initiated by Arora (l.c.) will need to be largely intensified.

The relevance of ethnobotany in drug research needs no elaboration. Reports of the folk medicine followed by critical scientific evaluation have given to the world newer resources

to fight diseases. Interest has been renewed in phytochemical screening and pharmacology of folk medicines. Some ancient folk medicines are now part of more broad based medicare programmes.

Pharmacologists are looking for more and more new vegetal sources for active principles. Researches must be intensified and organised on plants and diseases selected from ethnobotanical folklore.

Tribals in India have very small families; they employ certain vegetable contraceptives; several papers have recently appeared on the subject and vegetable products are still under active enquiry.

Taking clues from folk uses of some narcotics or hallucinogens, efforts are on to find suitable agents for anesthesia during operation.

Anesthetics made surgery painless; proper hallucinogens may one day make it even pleasurable. A good example already available is curare (from Brazilian vine *Chondrodendron tomentosum)* which was originally used as a hunting poison. It contains tubocurarine which is useful in surgery as muscle relaxant (Vogel, 1970; Maheshwari, 1987).

India with diverse flora, coupled with large number of aboriginal tribes inhabiting different pockets in the country, offers immense scope for ethnobotanists. Specially the mountainous tracts in central India, western ghats, and throughout the length and breadth of the Himalaya are inhabited by very distinct tribes with their own culture, religion, local beliefs, taboos and dialects, etc. The northeast India is inhabited mainly by the tribals. And perhaps of even deeper significance is the fact that this region possesses in the vedas and a variety of other documents, an ethnobotanical continum that enables the contemporary investigators to delve into the distant past and often to link modern folklore directly with that of ancient people and cultures.

Young scientists who have aptitude and facilities for field work may please analyse the bibliographies in the few reference works mentioned earlier and choose their line of work. Much useful original work on ethnobotany can be done also by carefully planned scrutiny of literature and herbaria.

Positive lines of work are available for improving tribal economy through some organised collection of plant products, on the spot conversion into transportable products and small cottage industries like in basketry and toy-making. It will be useful and more appealing if the objectives of research in ethnobotany can include social and economic uplift of the people of the area under study. With well planned objectives, critical approach and suitable methodology, ethnobotanical research can continue to reveal fascinating findings—findings of great interest to the researcher and even of immediate benefit to the people under study.

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2

PLANTS IN FOLK RELIGION AND MYTHOLOGY

Rai H.N. Chaudhuri[1] & D.C. Pal[2]

ABSTRACT

Tree worship played an important role in the religious history of the Aryan race in India. The ancient Indian cultures flourished in the midst of dense forests. Sages or Rishis used to impart knowledge to students in their hermitages in dense forests.

Since plants are the oldest associates of Man, plants are offered in worship of several deities. Plants are used for religious performances, among all races of mankind. In Buddhist literature, many references of tree worship and tree cult are available.

The present article deals with some important plants like *Ocimum sanctum* (Tulsi), *Aegle marmelos* (Bel), *Musa sapientum* (Kardali), and *Ficus bengalensis* (Vat), which are important in folk religion and also worshipped as symbols of gods and goddesses.

Introduction

Plants have profoundly influenced the culture and civilisation of man in many countries. In India, traditional tales, mythological stories, and events in the epics, as also innumerable religious practices of worship in the household and in the temples, in festivals, birth and death are all replete with references to plants. These associations can be traced from the prehistoric to modern times in a virtually unbroken line.

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The article deals with ten such species and provides details of their association in rituals, etc. The plants *Aegle marmelos* and *Ficus bengalensis* may be considered as temple trees and held sacred and symbolic of certain Hindu Gods. The rest are plants which individually or collectively figure in the numerous rituals from birth to death in a Hindu household. One or two of them figure in mythological episodes. Incidentally, a few of them have value as folk medicines and all of them are of ethnobotanical significance.

In the following account the botanical names are followed by Sanskrit (S) and Hindi (H) names, wherever known. Local names which are often traceable to the early Sanskrit names, often assist in establishing the botanical identity of the plants.

Aegle marmelos: S—*Bilva, Vilva;* H—*Bel, Bael*

Spinous tree with alternate trifoliate leaves and easily recognised by its numerous hanging globose fruits. It occurs throughout the drier regions of India; it is specially planted in places of worship.

The plant is considered as one of the important sacred trees in Hindu mythology. The three leaflets resembling the *Trishul* or the Trident are considered symbolic of creation, destruction and preservation, the powers attributed to Lord Shiva. Accordingly the tree is held in great veneration in Hindu mythology. The leaves constitute an essential element in worship. Particularly in Shiva temples, such leaves are also distributed to visitors who go there to worship. On the occasion of the annual "Shivaratri" day an all-night vigil is kept and special worship is offered with *Vilva* leaves.

The fruits also have importance. Called *Sriphal* in Sanskrit, the fruit is credited with the wish-granting properties. The tree is held in great esteem; particularly the womenfolk clasp the trunk of the tree and express their wish.

Saivite monks and the elderly devotees tuck these leaves in their tuft of knotted hairs as a mark of their regard for the sacred tree.

During the great festival of Durga Puja in September/October, the Goddess Durga is invoked to descend on the earth through the newly sprouting *Vilva* tree. The Sanskrit invocation reads

"Abahayami Debitang Mrinmaya Sriphala Preete" which underlines her fondness for the *Vilva* fruit, while the twigs and the leaves are used in the performance of *Homa*, i.e., oblation to the Fire God. In view of its sacred status, the tree is spared from the axe.

Tribal myths too are associated with this tree, although they do not hold the tree as sacred. On the other hand the tree is attributed to have sprung from the testes of a pig. The Gauria snake charmers of central India use the name of the *Vilva* tree with that of Dhanvantri, the celestial physician in certain magical rites performed to cure snakebite (Gupta, 1971). Many tribals specially use the thorns of the *Vilva* tree for tattooing their bodies.

Ficus bengalensis: S—*Nyagrodha;* H—*Vata*

Impressively large trees with very wide spreading canopy and numerous pillar-like aerial roots supporting the several long transverse branches. Common throughout India. Planted in temples and places of public worship like village yards. The tree in the Indian Botanic Garden, Sibpur, Howrah, is well-known for its unusually large canopy and over a thousand aerial roots.

The tree is held in esteem by the Hindus and is worshipped in many parts of India. Sometimes the plant is associated with some Hindu gods or demons. Such deities are believed to perch on its branches. The young maids in Bengal worship the tree for getting good husbands. The tree is also worshipped by ladies in memory of Sati Savitri who brought her dead husband to life by worshipping this tree. This is done on Saturdays during May and June.

Often the large trunk of the tree is surrounded by numerous stones, all smeared with vermilion and worshipped as symbols of Lord Shiva, for getting success in litigations and such other matters. The tree is not cut for fuel.

The tribal people also consider the tree sacred and as an abode of their gods. The numerous hanging aerial roots are considered symbolic of the matted hair of a long departed Guru. The latex of the tree mixed with oil of *Pongamia* is used in bird

catching. The tender root tips mixed with ginger are made into a paste as a poultice to heal in bone fracture.

Musa paradisiaca: S—*Rambha*; H—*Kela*

This is a large herb with pseudostems, huge wide-spreading leaves, and a large bunch of hanging fruits, cultivated throughout India for its varied economic importance. Every part of the plant is considered sacred in Hindu religion. Two whole plants on either side of the main entrance are used as decorations and symbols of plenty in social and religious ceremonies. During Durga Puja, a young plant draped with a new sari is worshipped as a symbol of 'Navapatrika'. During Pujas at the sacrificial part, a piece of its pseudostem is a must. The plant is worshipped during October/November by womenfolk wishing for a male child. In some states, the newly wedded bride is given this fruit as *Prasad* to assure her fertility. Leaves are used in offerings during religious and social ceremonies as these are considered superior to even silver plates. On the occasion of Lakshmi Puja in September/October, a boat made of banana stem and decorated with a sheaf of paddy is used for worshipping the Goddess of wealth and happiness. A bunch of bananas with a few betel leaves is a must in all religious functions. It is the chief component of offerings during the 'Satyanarayana Puja'—a puja performed on a full-moon day. Boiled green plantains with some rice and ghee are taken during the mourning period as a mark of austerity; these are taken on the leaves of plantain only and not in any metal tray. A mixture of ripe plantain, unboiled rice and Sesame seed (*Til*) is offered by the Hindus of Bengal to propitiate the departed soul.

Curcuma domestica: S—*Haridra;* H—*Haldi*

An annual rhizomatous stemless herb with a bunch of oblong-lanceolate leaves and an attractive colourful inflorescence. The dried rhizome is the turmeric or *Haldi* of trade and commerce.

For the Hindus the plant is very auspicious. Most of the rituals are performed with the rhizome in one form or the other. To get rid of the influence of evil spirits as well as for bringing

happiness and prosperity, turmeric is offered to Fire Gods or the Demons. Offering turmeric to women folk is a routine household function in marriage ceremonies.

Turmeric plays an important role in folk custom from birth to death. The Telugu speaking Hindus smear the mother with turmeric on the seventh day after the birth of a child. The Hindus of Maharashtra cut off the umbilical cord of the newly born baby and bury it together with turmeric. The invitation card for marriage or the new account books of shops are marked with fresh turmeric. This is one of the plants of 'Navapatrika' which are worshipped during Durga Puja. On the immersion day of the Goddess Durga which is known as Dussehra, the image is to be seen through water mixed with *Haldi* and kept in a container in which a mirror is floated. This is indicative of a smooth and prosperous period in the coming year.

The Mundas cut the turmeric on the grave of their dear ones and pour water on it.

Cynodon dactylon: S—*Durva;* H—*Darbha*

A perennial grass rooting at the nodes and forming a mat in lawns and on roadsides.

It is sacred amongst the Hindus from religious and mythological point of view. There is reference of this grass as a charm against baldness and anger in Rigveda and Atharvaveda. It is a favourite of Lord Ganesh who is said to remove all obstacles in life (Macdonell, 1958).

According to belief, the grass made its appearance when the sea of milk was churned by the gods and demons with the help of mountain Mandara as the churning stick and the serpent Vasuki as the churning rope. The grass is considered to be a remover of all sins because it is believed that Brahma resides in the root, Vishnu in the plant-body and Siva at the tips of the leaves.

In September, on the eighth day of the moon, people in Bengal wear a bunch of Durva with red thread on their arms as a mark of prosperity and long life. This day is specifically known as "Durva-Astomi". At the time of wedding, this is worn by the groom on his right arm.

Children are blessed by their parents by placing a few blades of this grass with paddy on their head.

The tribals make a paste from the plant and apply on cuts to stop bleeding and to avoid infection.

Mangifera indica: S—*Amra;* H—*Aam*

A large evergreen tree also widely cultivated throughout the country for its edible fruits.

The mango tree is considered sacred both by the Hindus and the Buddhists. Lord Buddha was once presented with a grove of mango trees under which he used to repose and since then the Buddhists consider the tree as holy. For Hindus, the plant has great religious significance (Randhawa, 1964). According to folk religion and mythological belief, the plant is considered the transformation of the God Prajapati, Lord of all creation. Therefore in all religious and sacred ceremonies its twigs are used. The leaves are tied on a string and hung as a symbol of prosperity in front of gates for social and religious ceremonies, including the Bengali New Year's Day and on the opening ceremony of a new shop. After any puja or *Yagna* is over, the priests chant mantras and sprinkle water on the people present at the function, with a small twig of mango.

Tribals use mango branches in a prophylactic rite to avert diseases in the village. They also take the powder of the seed-stone as food. There is a magical belief about the plant which is as follows : "A man, who first sees the inflorescence, smears it on his hand and inhales for three times, will not be bitten by the snakes in that particular year."

The tribals apply the gum on cracks in the feet.

Ocimum sanctum: S—*Tulsi*; H—*Tulsi*

A perennial aromatic herb grown in specially made pots or pedestal in orthodox Hindu homes. There are two varieties or cultivars, one with green leaves (*Saritulsi*) and the second with purple leaves (*Krishnatulsi*).

The plant is very sacred in India. The term *Haripriya* for it means dear to Lord Vishnu. According to folk belief the evil spirits cannot haunt a place where *Tulsi* is planted. The plant is worshipped in morning and in evening by placing an oil lamp

before it. The worship of *Tulsi* reached every corner of India through *Vaishnavism.* In Bengal, with the preaching of Chaitanya cult, the worship of *Tulsi* became universal. It is believed that water with few leaves of *Tulsi* becomes as holy as water of the Ganges. In some parts of India, according to Hindu tradition, a dead body is placed before a Tulsi plant or the plant is carried with a corpse up to the cremation ground and planted at the place where the body is burnt. In the month of April/May the plant is watered by an earthen pot with a small hole at the bottom being placed over it which prevents the withering of the plant in the heat of summer. The plant is never burnt by the Hindus; on the other hand, a dead plant is ceremonially immersed in a tank or river.

Small pieces of wood are used as beads in rosaries and necklaces by devotees of Lord Krishna. This is believed to remove sins. Of recent, this cult has infiltrated in the western countries.

Tribals use the leaves as an insect repellant, specially at the time of collection of honey.

Oryza sativa: S—*Dhanya;* H—*Dhan, Chaval*

The most common cultivated annual grass, its grains are rice, a staple food.

Among the Hindus, the plant with inflorescence is held sacred as a symbol of Goddess Lakshmi, i.e., wealth, and is used on all auspicious occasions. On the full-moon day after the Durga Puja, specially in Bengal, a basket of paddy is worshipped as an incarnation of the Goddess Lakshmi. There is a taboo on consuming new rice until it is offered to Lord Vishnu. This is locally known as *Nabanna.* According to mythology or folk belief, rice is considered sacred by the Buddhists, as the life of Sidhartha was saved during his fast, by Sujata offering him rice prepared in milk.

Paddy is one of the things to be worshipped in ceremonial occasions of Hindus.

Tribals perform the rice festival under different names. They keep some sticks on the paddy field as a seat for birds and owls for protecting the crops from harmful insects and rats. They also sweep the paddy fields with the twigs of *Beguna*

(*Vitex)* for better crop. The effect may be due to the aromatic smell of the plant which repels the stem borers and panicle cutters. They also use *Parasi* (*Cleistanthus*) for the same purpose.

Sesamum indicum: S—*Tila;* H—*Til*

Erect annual herb with purple or white tubular flowers, cultivated throughout India for its seeds which yield a valuable oil known in trade and commerce as Gingelly oil. Two varieties of seeds, viz., black and white are common.

The seeds of this plant, specially the black ones, have been considered sacred and are used in religious ceremonies. According to Manu, *Sraddhas* performed with a copious measure of *Til* seeds become inexhaustible. More or less, the same practice is still being followed in Bengal. On the occasion of *Sraddha* ceremony, one part which is known as *Tila Kanchan*, adequate black seeds of *Tila* and a piece of gold is offered to God for eternal peace and rest to the departed soul in heaven. In that particular ceremony, *Til* seeds are also mixed with *Pindas* prepared out of unboiled rice mixed with meshed plantain which is offered to the departed soul with water as food and drink. So the Hindus consider this seed as very important from the ritual point of view. The black seeds along with fruits of *Haritaki (Terminalia)* are used to mark successful completion of the Puja. The offering of *Til* seeds is believed to remove sins. According to a belief the *Til* seeds arose from the limbs of Rishi Kashyap.

Cocos nucifera: S—*Narikel;* H—*Nariel*

A tall unbranched palm with a crown of long leaves, cultivated in damp saline soil, common on the sea-coast. It is the popular coconut.

It is considered sacred for its fruits as a symbol of good fortune. The fruit is believed to fulfil one's desire and so it is offered to God. A whole green coconut with its stalk is an essential item in Hindu religious ceremonies. In wedding and other auspicious occasions, the green coconut is placed on an earthen pitcher filled with water in front of the pandal. In Bengal *Purna Kumbha* is made out of a pitcher filled with water and adorned with paddy, mango twig and a green coconut

smeared with vermilion. The dried fruit is also used on several social and religious occasions. In Gujarat, the bride offers a coconut to the bridegroom which is preserved by him throughout his life. In Mysore, it is worshipped as a family God, while in other places of India the coconut is worshipped as Saraswati—the goddess of learning. Among the Sakta community of Bengal, a dry coconut, after removing the fibrous outer covering, is offered as a symbol of the human head during the Bhadrakali Puja; it is possibly the replacement of the old tradition of human sacrifice.

Regarding the origin of the plant, there is the following legend:

"Rishi Vishwamitra sent King Trishanku from earth to heaven by his superhuman power obtained by long austerities. Indra got annoyed over this and sent back the king from heaven to earth but he was stopped by the Rishi by putting a pole under him which ultimately became the coconut tree" (Wilson, 1961).

The plant is not cut by the Hindus, neither do they use the wood for fuel because the plant is considered to be the seat of Lord Narayana. This is a means of conservation of this economic plant

The tribals use the fibre of the plant for making fish traps, the midribs for brooms and the leaves for thatching the roofs of their houses.

The ash from the mature shell of the fruit is mixed with lime and applied on ring-worm. The shell is used as a container.

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3

TREES, FLOWERS AND FRUITS IN INDIAN FOLK SONGS, FOLK PROVERBS AND FOLK TALES

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ABSTRACT

Plants have been an integral part of Indian life and culture, and hence all aspects of folk literature, namely folk songs, folk tales and folk proverbs of our country have profuse references to trees, shrubs, climbers and their flowers and fruits.

Folk songs are particularly rich in references to flowers and fruits. Folk songs sung on various occasions from birth to death, in times of joy and sorrow, in festivals, ceremonies and rites, have abundant references of plants. Folk proverbs having references to plants are indicative of the deep insight, common sense and practical wisdom of the common folk.

Although folk literature in different regional languages in India has developed and evolved in different environments and circumstances, the overall literary character of folk literature of the country shows striking similarity. Perhaps this is because the inherent culture of several regions of our nation is the same.

Introduction

The indigenous culture of a nation is reflected in its folklore. India has been bestowed with a rich variety of flora and vegetation. All activities of life in this land centre around trees and flowers. Hence references to trees and flowers are closely woven with the folklore.

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In the following pages, plants are referred generally by the local names as they appear in Hindi literature. Wherever common English equivalents are available they are given for wider appreciation. For the benefit of scientists several botanical names are given in Appendix.

FOLK SONGS

References to trees and flowers are found profusely in folk songs, particularly in songs of worship of plants. There are a number of folk songs in worship of the *Peepal* tree. Folk songs in worship of *Peepal* are sung in Uttar Pradesh, in Kerala for Vishnu, in Bhojpur for the Sun and in Rajasthan for Kubair, the deity of wealth (Sahal, 1949). *Peepal* is considered in Kumaon as a tree of the land where several *rishis* meditated and in Tibet as a tree of the land where the Buddha meditated. Some people consider the banyan tree as the abode of Shankar or Savitri; others consider that Brahma resides in its roots, Vishnu in its trunk and Shankar in its branches. Folk songs in praise of *Sal*, *Aak*, plantain, *Saj*, mango, *Aonla*, bamboo, *Neem*, *Ashok*, basil and *Amaltas* are sung, believing that these plants are the abode of several gods and goddesses. The Yawan races consider palm and *Maulshri* as sacred, and plant the latter near mosques.

Flowers, fruits and plants as offerings

Religious songs have references to offerings of flowers and fruits. Pomegranate, almond, *Palash*, *Keora*, *Bela*, *Kachnar*, *Champa*, *Gurhal* and *Mahua* etc., bear flowers and fruits which are offered to gods and goddesses to invoke blessings for the fulfilment of wishes (Matiyani, 1957). In Bengal and northern India, fruits and leaves of *Bel*, *Dhatura*, sandalwood, cloves, arecanut, betel-leaf and coconut are given as offerings to Shiva. In the Tarai region, women carry flowers of *Jai* in plates of gold and silver in the evenings as an offering to gods, and flowers of *Champa* and *Jai* as offerings to ancestors. In Bhojpuri and Magahi folk songs, the leaves of the lotus are considered as the bed of Gaura-Parvati and in Bengal as the bed of Saraswati (Aryani, 1965). *Durba*, *Kusha*, sandal, rice, saffron, betel-leaf and cloves, etc., are essential articles in religious festivals (Matiyani, 1958).

Festivals of trees and flowers

Bengal is a leader in display of love for trees and flowers. The *Bel* tree is worshipped in Bengal and a twig is considered as token of a good crop. Ahirs and shepherds of Oudh celebrate the festival called Jamghat in which they apply mud on their bodies and sow barley seeds in the mud. When seeds sprout they sing and dance and sing a particular song called Jawara. In Himachal Pradesh, the new crop of maize is celebrated with a fair called Minjar. The festival which lasts for several days is marked by fixing the ears of maize on the clothes of men and women, going in grand processions. The Ukhiang festival of Himachal Pradesh and the Waha festival of the Santals of Bihar, both centre round flowers. During the 'Daur Durva Worship' festival in Kumaon, barley, wheat, gram, mustard, and maize find place in the songs of worship. The festival of Basil is celebrated in Mysore. In Bundelkhand at the time of the festival of Mamulian, girls decorate the spiny, green branches of *Babul* with colourful flowers. They offer various fruits to the tree for the fulfilment of wishes. In Mandsor district of Madhya Pradesh, which is known for the cultivation of opium, a festival of this crop is celebrated (Sankrityayan and Upadhyaya, 1960).

Trees, plants, flowers and fruits in rites

Certain trees like *Peepal*, *Mahua*, *Neem*, banyan, and basil find a prominent place in the songs sung in religious rites. In certain places both the Hindu and Muslim women offer the same flowers and fruits in temples as well as mosques. According to a folk song of Chattisgarh, King Akbar himself went to a temple to offer betel and arecanuts. Offering betel, arecanuts and coconuts to gods and goddesses, use in social activities or their gift is common (Tripathi, 1951). Similarly, auspicious occasions such as birth of babies, thread ceremonies, marriages and other religious functions, all have associations with *mandaps* made from bamboos and plantains, the painting of floors with sandal and the decoration of doors with mango leaves. In thread ceremony, *Palash* is an essential item (Upadhyaya, 1960).

Good omens from trees and flowers

On important occasions, when man does not feel that his efforts and work are enough to bring forth results, he begins to depend on good and bad omens, and oracles and totems (Anonymous, 1959). A view of the lotus even in a dream is considered significant in Kumaon folk songs. Seeing or smelling leaves and fruits of mango and flowers of *Aonla*, or *Jai* is considered auspicious. To get leaves of *Peepal*, to burn camphor in a sandalwood lamp, to wear a garland of *Aonla* and basil or to keep plants of basil, sandal, *Kadamba*, *Peepal*, *Ashok*, mango and citrus in the house are symbols of wealth and religious faith. In Bengal, bathing the plants of basil and *Peepal* in flowing river is considered ominous. It is believed that if basil fruits are put on the head of a person at the time of death, he goes to heaven.

The bad omens from plants, trees and flowers

To see the flowers of *Kans*, a view of *Jujuba* or of a falling tree or its branch and its drying are considered symbols of destruction and loss. In the Tarai area, some bad omens are even associated with the rose.

Taboos of certain trees and plants

It is considered bad to pluck flowers in the afternoon. It is a taboo to give offering of flowers of *Kunda* and *Ketaki* to Shankar, *Dhatura* to Vishnu and *Aak* to goddesses. No bud, except of *Champa*, should be offered to any gods and goddesses. Women desirous of giving birth to a son should not cut pumpkin, or watermelon or pluck fruits of lemon. It is a taboo to pass under the trees of tamarind and *Peepal* at night and to cut the trees in a burial ground; violation can attract bad spirits. The tribals consider cutting the *Peepal* and banyan tree more sinful than killing a saint. In Uttar Pradesh, even folk songs for children prohibit the cutting of *Peepal*, banyan and sandal trees. In Kumaon, cutting of timber after sunset is believed to attract illness of children (Anonymous, 1959). It is believed that using *Peepal* wood and bamboos for burning in a *Yagya* can destroy the whole family. Urinating under a mango tree can cause leprosy and planting the *Jujuba* tree in the house or in the courtyard is a sin and the owner can become a pauper.

Totems based on trees and flowers

Childless women do a number of totems for having a son. In Bhojpur, the offering of sesame and rice, or plantains in a bamboo basket, or lemons and oranges or sugarcane to the sun near a river bank is a totem. Some women offer puffed rice on the day of *Nag Panchami* (Upadhyaya, 1960). Tribal women worship the fig, or place old torn clothes on trees particularly of *Jujuba*. They encircle the mango tree seven times to get a charming daughter-in-law. They offer many totems on bamboo or *Babul* for successful completion of son's marriage. To a *Peepal* tree, they offer salt for skin diseases, cloves for eye diseases and milk for indigestion of children. The people of Oudh believe that if flowers of *Ketaki* and *Palash* are touched to the body of a snake-bitten person accompanied with some *Mantras*, he is cured.

Trees and flowers in decoration

Several folk songs refer to the fact that women not only use the *Kaner*, *Jamb*, jasmine and rose flowers, but also several fruits in personal decoration. The use of flowers in decorating hair is a speciality of Bihar, Gujarat and several other states. According to Gujarati folk songs, Rama fell in love with Sita mainly due to the beautiful floral decoration of her hair. Jasmine and rose are used for the *Sehra* (floral strings to cover the face) of the bridegroom. The marital bed is prepared from the wood of clove and sandal and decorated with the flowers of cloves, jasmines and *Kadamb*.

Lemon, turmeric, sandal and *Parijatak* are used in the formation of a paste for improving the complexion of a bride. Brides use rose, *Keora*, henna, sandal and the flowers of mango to perfume their bodies. References to the use of *Palash* for dyeing clothes are common in folk songs, particularly of Kumaon. In Bengali songs, references are made to the decorating of walls of houses with straws of rice and several flowers.

Plants in similes and metaphors

Many plant names appear in similes and metaphors in Hindi literature, e.g., the flowers of *Jay* for tenderness and the buds of *Champa* for beauty. The tender trembling heart of ladies has been compared with the vibrating leaves of plantain, *Peepal*

and lotus. The red lips of the beloved have been compared with red flowers of *Kachnar* and of the silk-cotton tree. The tenderness of women has been compared with tender twiners, slimness with cumin and stockiness with betelnut. The breasts of the bride are compared with lemon, orange or lotus and her big eyes with the divisions of these fruits. A bride in her in-law's house sings songs and compares the sweetness of her parents with mango and bitterness but usefulness of her teacher with *Neem*. A girl breaks away from her family after marriage like the tender stem of castor, whereas her husband, like a thin twig of bamboo, bends but does not break. A woman considers her fields and fences as a part of her family and invites them to the marriage of her daughter. In a Magahi song there is a mention of sandalwood trees crying when the king takes *Vanaprastha* and becomes a Yogi. How beautiful is such personification of the qualities of plants and their parts in the human beings (Aryani, 1965).

FOLK PROVERBS

Things which cannot be remembered or explained easily are learnt, taught and emphasised through proverbs. For example: "*Ati ko phulon sahajna, dar pat se jaye*" i.e., as *Sahajna* tree after profuse flowering loses its leaves and twigs; a person who indulges in excess of anything is destroyed.

A person who understands the tricks of the cunning tells him that "*Tum dar dar ham pat pat,*" i.e., I will keep away from you.

The words of the learned people have many hidden meanings of wisdom. In a proverb it says: *Jyon 'kela' ke pat men, pat-pat men pat,* i.e., in plantain, sheaths go on coming out of its numerous layers of pseudostem.

When too many people desire to share particular thing, the proverb says "*Ek anar sau bimar,*" one pomegranate and a hundred patients wanting it.

Talking of very high prices the proverb says:

"*Chana chironji ho gaye, gehun ho gaye dakh*", i.e., the grams have become as expensive as *Chironji* and wheat as grapes. Talking of success after hard work the poet said "*Rang lati hai*

hina, patthar par pis jane ke bad", i.e., Henna shows good colour after it is repeatedly ground on the stone.

FOLK TALES

Like songs and folk proverbs, the folk tales also have references to the association of plants with good and bad omens. They discuss the resemblance of human beings with birth and several other characteristics of plants. According to one tale, *Aonla* was born from Brahma's tears of love. Other trees and men were created after that. Regarding *Champa* and jasmine, it is said that two loving children were buried by their stepmother in a heap of rubbish and here two trees grew—the *Champa* and *Chameli*. The tree called *Arjuna* is said to have been born of the two sons of Kubair after sant Narada cursed them. The banyan tree was created by Shiva. It is said that when the demon Bhasmasura wanted to destroy Shiva and marry Parvati, Shankara (Shiva) took the form of a banyan tree and stood firm. It is, therefore, said that the banyan tree can never be destroyed. The Lord is said to sleep on the leaf of *Akshaya Vat*, the indestructible banyan tree, on doomsday. In the story of the *Tulsi* it is said that when Sati Vrinda cursed Vishnu and made him a black stone (which the Hindus call Shaligram) then Vishnu also cursed Vrinda and made her the *Tulsi*—the plant basil. About the *Peepal* and *Palash*, it is said that once Parvati became angry with Vishnu and Brahma and cursed them; the result was that the first *Peepal* tree was created from the body of Vishnu and the first *Palash* tree from the body of Brahma (Chaturvedi, 1965).

A tale in Kurmanchal states that the husband of a princess threw the wicked daughter of a cunning minister into the tank and she became *Bicchu Buti*, i.e., the stinging plant (Pant, 1958). The plant by name *Gulbakavali* grew at the spot where a certain princess named Gulbakavali used to rest, and by using the flowers of this plant, the sight of a blind king was restored. Aboriginals of Vindhyachala believe it to be true even today (Jain and Shrivastava, 1955).

Some folk tales refer to the help rendered by plants to their dear ones whom they seemed to recognise. According to a folk

tale of Malva, Sonabai took refuge on a sandalwood tree to save her chastity. On her prayers the tree grew higher and higher protecting her from her oppressors. Finally, the tree split concealing Sonabai and thus saved her honour.

According to a tale, a mango tree dried up because one of the fairies of heaven looked at it with despise.

According to some tales, men have been born from the trees and plants. Shiva is said to have married a beautiful twiner on a *Peepal* tree. Later, a black obstinate son was born from this twiner. One day, Shiva became angry and turned him out from the house. The son started wandering in the forest. The Kol and Bhil tribes consider themselves to be the progeny of this person born of a twiner. Innumerable such tales are found in our literature.

Thus, from the very ancient times, Indian folk life has not only been including trees, plants and flowers as members of their own family but has also found in them, the image of God (Jain, 1958). It is for this reason that the songs, tales and other expressions are replete with deep affection for trees and plants.

Two things are particularly noteworthy. Most poets have innocently sung about our trees and plants, and yet a study of such literature leads to deep knowledge. For example, one learns, which trees and plants are abundant in which spots; what are their forms, size, shape and colour; when do they flower and fruit; for what qualities are they worshipped; and what is their contribution to our life, etc. The second is that despite certain variations in different parts of the country, basically they are all similar. It appears as if one and same soul has been expressing in different languages. This oneness of culture is an evidence of oneness of our country, where Kashmir worships with saffron and Rameshwaram with coconut; Assam worships with rice and Kerala with sandalwood. But they all worship with plants and worship the same Almighty.

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APPENDIX

(Probable botanical equivalents)

Aak	*Colotropis* sp.
Amaltas	*Cassia fistula* (Laburnum)
Aonla	*Emblica officinalis* (Emblic myrobolan)
Arjuna	*Terminalia arjuna*
Ashok	*Saraca asoca*
Ashok	*Brownea ariza*
Babul	*Acacia nilotica*
Bel	*Aegle marmelos*
Bela	*Jasminum* sp.

Bicchu Buti	*Girardinia palmata*
Chameli	*Jasminum* sp.
Champa	*Michelia champaca*
Chironji	*Buchanania lanzan*
Dhatura	*Datura* sp.
Durva	*Cynodon dactylon*
Gurhal	*Hibiscus rosa-sinensis*
Hina	*Lawsonia inermis*
Jai	*Jasminum* sp.
Jamb	*Syzygium* sp.
Kachnar	*Bauhinia* sp.
Kadamba	*Anthocephalus chinensis*
Kaner	*Nerium* sp.
Kela	*Musa* sp.
Keora	*Pandanus* sp.
Ketaki	*Pandanus*
Kusha	*Desmostachya* sp.
Mahua	*Madhuca longifolia*
Maulshri	*Mimusops elengi*
Neem	*Melia azedarach*
Palash	*Butea monosperma*
Peepal	*Ficus religiosa*
Sahajna	*Moringa oleifera*
Saj	*Terminalia* sp.
Sal	*Shorea robusta*
Tulsi	*Ocimum sanctum*
Vat	*Ficus bengalensis*

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WILD PLANTS IN INDIAN FOLK LIFE— A HISTORICAL PERSPECTIVE

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ABSTRACT

Nearly forty utility groups of wild plants in Indian folk life are enumerated. For each use selected examples are mentioned out of nearly 5000 reportedly useful wild plant species. The various categories of uses of wild plants are arranged in a quassi-chronological order beginning with those used by the gatherers, hunters and fishers to those used by farming communities, etc., in keeping with the socio-economic and cultural evolution of man in the subcontinent.

The article makes it amply clear that the wild plants in Indian folk life have been and are used to meet all kinds of requirements. And there is enormous germ plasm which can be profitably employed to improve the modern cultivars, and some of the wild plants can be adopted as future food, fibre and oil plants to meet the increasing demand.

Introduction

It is estimated that nearly one-third of the about 15,000 higher plant species in India are usd by the tribals and poor people. These wild plants meet most requirements both for man and his domesticated animals.

These various uses are: barks of trees for clothing; fibres and floss for nets and clothing; vegetable fat as a luminant and as a cooking medium; bows, bow strings, fishing nets and floats to

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carts, wheels, wheel spokes, axles, mortars, poles, posts, turnery and combs to musical instruments are all made from these plants; wild seeds are used by potters to smoothen earthenware before firing and are used as a measure by goldsmiths; wild plants are used to poison arrows and darts, as also being used as spices and condiments; wild plants are also useful to poison and stupefy fish and as antidotes to snake, scorpion and dog-bite; used as incense, perfumes, dyes and insecticides; intake of wild plants increases yield of milk in cattle; charcoal is used as gun-powder and for smelting iron; beads for rosary; materials for writing; sand paper for polishing wood, ivory and horn; cleaning well water and cleaning teeth; washing clothes, the mucus of seeds in mortar or plaster to keep away white ants; the production of fire by friction of wood and in rituals and ceremonies, etc.

The use of such a large number of wild plants species to meet diverse requirements is due to the diversity of vegetation in the subcontinent. Natural calamities such as famines and floods have often led man to seek food in wild plants and these have further added to the list. There is indeed enormous germ plasm in the vast number of wild plants used by man, that can be fruitfully employed to improve the existing cultivars and to adopt new ones.

The prolonged use of wild plants has played an important role in the socio-economy of man to the extent that some of them have found place in his rituals and ceremonies and some have been accorded sanctity (sacred plants). Even where modern man has drifted far away from his dependence upon plants, as a matter of reminiscence, perhaps he still continues to use some of them, though rarely, like the wild rice grains gathered and eaten by Brahmins on certain days of fast.

The vast knowledge of their utility, geographical occurrence and biology and phenology in whatever crude manner he understood them, resulting in such an association with them that the plants entered his folklore, idioms and phraseology. Scores of examples of this can be picked up from Indian folk literature. An example from the Rajasthan desert is given here.

Ak ra johpra
Phok ra bar
bajra ra rot

Moth ri dal
Dekho re Raja
Teri Marwar

Huts of the ak
Berries of thorns
Bread of Millet
Dal of Moth
Behold Raja your Marwar (English rendering by Todd, 1829).

Substituting botanical names, this piece of folklore means Behold King, your Marwar (Rajasthan desert) is characterised by huts made of *Calotropis procera*, berries of prickly *Zizyphus* sp., bread of *Pennisetum americanum* and pulse curry of *Vigna trilobata.*

Aonla, aonla Mewar
Bawul, bawul Marwar

Here plants are used to distinguish Mewar from Marwar. English rendering would be *Cassia auriculata* characterises Mewar, whereas *Acacia nilotica* ssp. *indica* characterises Marwar.

Below is the statement of Raja Bheem where he uses names of plants to distinguish his own land from that of his enemies in Rajasthan.

> Wherever the *Aonla* (*Cassia auriculata*) puts forth its yellow blossoms, the land is of right ours; we want nothing more, let them enjoy their stunted *Babuls* (Acacia), their *Kureels* (*Capparis decidua*), the *ak* but give us back our sacred *Peepal* (*Ficus religiosa*) and the *Aonla* of the border."

(English rendering by Todd (1829, 54); the botanical equivalents given by the author).

The utility of so many wild plants for various purposes is a result of the progressive development of human cultures. Soon after his ascent from apes about 2,50,000 years ago, and after attaining the brain capacity of about 13,000 cc (averaging the modern man), man continued for a fairly long time as a hunter and gatherer. It was several thousands years later that he took to settled agriculture, but his old traits continued alongside. In the earlier stages he manufactured stone tools and he became a potter subsequently. With the advent of the metallic age he first used copper, silver and gold, and some thousands of years later discovered iron. He moved from rockshelters to huts and then

to mud and brick structures and from stones to metals. The society gradually consisted of several socio-economic professions; many depended directly or indirectly upon the wild plant life. It was during this time that many more wild plants were brought into use.

Whereas a clearer picture of the chronological history of socio-economic development of man can be painted from anthropology, archaeology and ancient history, not much direct information is available of the kinds of wild plants used to meet various requirements. Luckily, this socio-economic development in the subcontinent has not been purely unilinear, rather various levels of development have persisted, so that it still continues to have exclusive hunters, gatherers and fishers living side by side with the sophisticated man for whom hunting and fishing are today not the means of subsistence but sport.

This situation prevalent in the subcontinent facilitates in building up the quasi-chronological order of the use of wild plants.

The paper mentions nearly forty uses of wild plants. Within each category of a particular use, the subsequent manifestations are also included such as the use of wild fruits in pickles, jams, jellies about which the early man was indeed unware. The use of leaves as vegetable, their use to flavour curries, to wrap tobacco and as substitutes for tea and coffee have chronological basis and are therefore mentioned under separate categories.

Under each category some selected examples of wild plants are mentioned.

The examples of wild plants cited in the text include those from the author's own field observations in tribal areas in various parts of the country gathered over the last quarter of a century and from scientific literature of the last hundred years (Drury, 1873; Watts, 1889-1899; Kirtikar and Basu, 1935; Krishnamurthy, 1954; Chopta *et al.*, 1956; Vartak, 1959; Dastur, 1964; Jain, 1964; Jain and De, 1964, 1966; Singh and Arora, 1978; State and District Floras, Anonymous, 1940-76, etc.).

There is a wealth of information on wild plants in Indian ancient literature. Advantage could certainly be taken of this in the chronological treatment of the uses of wild plants attempted here. But the chronology of this literature is in dispute. Even though there is a consensus of opinion that the earliest literature was written by about, or during, the Iron Age, there is believed

to be considerable overlap in the ancient texts which forfeits any chronological aspects. Even if this were straightened out, unsurmountable difficulties arise in the proper identification of plants from their Sanskrit names as given in literature. In many cases it appears impossible.

The examples are cited by the Latin names only. In the context of the entire Indian subcontinent, it is not possible to give the local names for they would be too many for a single Latin name. The chief object was to put together all the uses of wild plants with some suitable examples and to arrange them in a quasi-chronological order in keeping with the cultural evolution in the subcontinent.

THE USE OF WILD PLANTS IN HISTORICAL PERSPECTIVE

Food

Apart from the underground parts (tubers, corns and bulbs) of several wild plants which are dug out and eaten, the leaves, flowers, fruits and seeds of a large number of wild plants are gathered and eaten.

(a) *Underground parts, tubers, rhizomes, etc.* At least 80 wild plant species are known of which roots, tubers and rhizomes are eaten in almost all climatic regions of the country. The giant taros and yams are eaten raw, or cooked after repeated washing to get rid of the bitterness and pungency, or in some cases ground to a flour for cakes and puddings (*Dioscorea hispida*, *D. bulbifera*, *D. aculeata* and *D. pentaphylla*); *Cyperus rotundus* roasted and eaten in Rajasthan; *Cyperus bulbosus* in the peninsular region; bulb powder used with flour of Bajra and Jowar, *Curcuma angustifolia* in east India; *Codonopsis ovata* in Lahul; tubers of *Aponogeton natans*, *A. appendiculatus* a great delicacy like potatoes, rhizomes of *Nymphaea pubescens*, tuberous roots of *Phaseolus adenanthus* in Travancore; fusiform roots of *Borassus flabelifer* by the poor people in Northern Circars and of *Costus speciosus*, *Balanites aegyptiaca*, *Hyphaene thebaica* in the Nilgiris, tubers of *Plesmonium margaritiferum* by Kols and of *Scirpus grossus* by tribals in Gujarat. The aerial bulbs of *Dioscorea versicolor* are also eaten. Some of them are also used as condiments, e.g., *Alpinia galanga*, *A. Speciosa*, *Angelica glauca* are added to food for flavour in west Himalayas; *Decalepis hamiltonii*

in the Western Peninsula and Andhra Pradesh; *Gastrochilus pandurata* in Konkan and Andamans; and *Zingiber montanum* and *Z. zerumbet*. Some plants are candied (*Asparagus racemosus)* or pickled (*Asparagus adscendens)*.

Amongst the cultivated ones may be cited—*Alocasia macrorhiza* in the hilly tracts of eastern and northeastern region; *Amorphophallus campanulatus*, *Colocasia esculenta* in the Sub-Himalaya and the Western Ghats; *Curcuma amada* in West Bengal, Konkan and Tamil Nadu; *C. zedoaria* in East Himalaya and Western Ghats; *Tacca leontopetaloides* in eastern India; *Tulipa stellata* in West Himalaya and *Zingiber zerumbet*, *Scirpus lacustris*, *Dioscorea esculenta* and *D. alata*, etc.

(b) *Leaves and shoots.* There are over 250 wild plant species comprising herbs, shrubs and trees of which leaves and shoots are gathered and eatent raw or cooked as vegetable. Apart from their use as vegetable in curries, tender leaves of *Acacia sinuata* in drier parts and of *Oxyria digyna* in West Himalaya, being acidic, are used for *chutney;* leaves of *Acronychia pedunculata*, *Allium sphaerocephalum* (in Lahul), *Cinnamomum tamala*, *Clausena excavata*, *C. indica*, *Murraya koenigii*, *Oenanthe javanica*, etc , are used as condiments to flavour curries. Leaves and stems of *Bambusa tulda*, *Caralluma adscendens*, *Cicer soongaricum* in Ladakh and Lahul, *Salicornia brachiata*, etc., are pickled. Leaves of *Clausena heptaphylla* in northeastern Hills are chewed with betel leaves. Leaves of *Tomarinuds indica* (Tamarind), are sold in the market at Hyderabad.

Chenopodium album, *Nasturtium officinale* and *Portulaca oleracea* are cultivated.

(c) *Unripe fruits.* The unripe or semi-ripe fruits of nearly 60 wild plant species are used as vegetable and in some cases also pickled. These include jack fruit (*Artocarpus heterophyllus*), wild lime (*Atlantia monophylla*), wild cucumber (*Cucumis melo* var. *agrestis)*, elephant-apple (*Dillenia indica*), wild banana (*Ensete superbum*), egg-tree (*Garcinia xanthochymus*), etc.

(d) *Flowers (including floral buds) and inflorescence.* There are over 35 wild plants of which flowers are eaten either raw (*Alpinia galanga*, *Caryota urens*, *Madhuca longifolia*, *Periploca aphylla);* or cooked as vegetable (*Bambusa bambos*, *Calligonum polygonoides*); made into bread (*Madhuca longifolia*, *Ardisia griffithii* whose cooked flowers taste like fish); pickled (*Capparis*

spinosa); alcoholic beverage prepared and sweets made (*Madhuca longifolia*); or used in the preparation of cool drinks (*Rhododendron arboreum, Woodfordia fruticosa*).

(e) *Seeds/grains*. Seeds of over 50 wild plant species are eaten roasted and boiled (*Artocarpus heterophyllus, Bauhinia vahlii*); either raw or in sweets (*Buchanania laznan, Euryale ferox*); in betel leaf as a masticatory (*Caryota mitis*) in the Andamans; as raw or cooked seeds (*Cicer soongaricum*) in Ladakh; roasted seeds as coffee (*Mucuna prurita*); made into coarse flour *Sattu* (*Polygonum glabrum*) or cooked as pulse (*Vigna vexillata, V. pilosa*). The kernels of *Ximenia americana* occurring in the peninsular region and the Andamans taste like filberts.

Seeds of *Sorghum halepense, Echinochloa colonum* (Jungle rice), *Dinochloa scandens* and *Panicum turgidum* are also eaten mainly during scarcity.

Fodder grasses of which seeds are collected and eaten in time of scarcity are listed under "Foods during famines and scarcity", such as several species of *Panicum* (*atrosanguineum, hippothrix, paludosum, trypheron*), *Echinochloa* (*stagnina, crus-galli* and *colonum*), *Pennisetum alopecuroides* and *Paspalidium flavidum*.

(f) *Fruits*. The fruits of over 300 wild trees and shrubs are eaten largely because of their sweet pulp or succulent aril (*Aglaia edulis* in the northeastern Hills, *Aporusa oclandra, Baccaurea courtallensis*) Even insipid fruits of *Coriaria nepalensis* (in the East Himalaya), and of *Olax nana* and acidic fruits of *Crataegus oxycantha* are eaten. Wild fruits are also used as seasoning material (*Dillenia aurea*) or to prepare sweet drinks (*Dillenia* sp., *Feronia limonia, Myrica esculenta*). Wild fruits are also used in tarts (*Docynia hookeriana* in the northeastern Hills), jellies (*Elaeagnus latifolia*) and jams (*Emblica officinalis*). Fruits of *Elaeagnus angustifolia* are used in brewing local beer, and pulp of the fruits of *Euodia fraxinifolia* and *Feronia limonia* is used in chutneys.

Fleshy and succulent fruit axis with inflorescence of *Hovenia dulcis* is eaten and it tastes like pear. The fruits of *Modhuca longifolia* are cooked and eaten. Fruits of *Pinanga dicksonii* are used as a substitute for betelnut in the Western Ghats. Wild raspberry (*Rubus niveus*) is sold in the market.

Hunting

Bows are made from *Grewia subinaequalis*, and *Cephalostachyum capitatum* (also for arrows in Assam). Bow strings are made from fibre of *Marsdenia tenacissima*, *Sansevieria roxburghiana* (leaf fibre) and *Calotropis gigantea*. The arrow tip poison is derived from the stem juice of *Antiaris toxicaria*.

The sword handles are made from the wood of *Ehretia acuminata* var. *serrata*.

The poison for the tigers is derived from the roots of *Colocasia montana* and *Alocasia montana*.

Antidotes

Several wild plants are used as antidotes for bites by animals and insects.

For snakebite, roots of *Gymnema slyvestre*, *Kyllinga erecta*, *Aneilema divergens*, *Anogeissus latifolia*, *Berberis aristata*, *Flacourtia indica*; leaves and flowers of *Mesua ferrea*, *Peristrophe paniculata*, *Sarcostemma acidum*, etc., are used.

For scorpion bite, *Anogeissus latifolia*, *Leucas cephalotes* and for rat bite *Berberis aristata* are used.

In Assam, leaves of *Zanthoxylum scandens* and *Caesalpinia tortuosa* and leaves and flowers of *Rosa longicuspis* are tied over wounds caused by dogbite.

For insect-bite the milky juice of *Calotropis gigantea* is used in Assam.

Fishing

Fishing nets are made from fibre of bark of *Abroma augusta*, *Boehmeria nivea*, *Marsdenia tenacissima*, *Pandanus tectorius*, and *Calotropis gigantea* and floats for fishing nets are made from the fruit of *Adansonia digitata* and pith of *Aeschynomene aspera*.

For intoxicating fish, the root and bark of *Barringtonia acutangula* and the fruit of *Randia* spp. are used. Poison derived from *Walsura trifoliata* (in Travancore), *Casearia elliptica* bark of *Madhuca butyracea*, latex of *Excoecaria agallocha* (used also on arrows), seed of *Pongamia pinnata*, *Xeromphis spinosa*, *Careya arborea* and root of *Tephrosia purpurea* are used to poison fish.

Fishing rod is made from *Dendrocalamus strictus* and *Cephalostachyum pergracile* in Assam and central India

Knees and props for boats are made from *Ceriops tagal.*

Bark for clothing

Large piece of bark of *Antiaris toxicaria* is used in south India as natural cloth after it turns white and furry by soaking in water and beating it. The tribes use the inner bark of *Trema orientalis* as natural cloth.

To produce fire by friction

Wood of *Helicteres isora* which grows at the foot of the Himalaya, in peninsular India and at the base of the Travancore hills is used to produce fire.

Use by potters

Seeds of *Adansonia digitaria* are used to smooth an earthenware before firing, and leaves of *Adhatoda zeylanica* are used to wash and paint unglazed pottery before firing to give it a black colour.

Fibre

Cordage, garments, sacks, mats, shawls, coarse cloth and ropes also used for tying rafts and dragging elephant, etc., are made from fibre of several wild plants, such as: the bark of *Abelmoschus moschatus* and *Abroma augusta*, stem of *Abutilon theophrastii*, *Acaia senegal*, *Agave americana*, *A. sisalana*, slender twigs of *Acacia nilotica*, bark of *Antiaris toxicaria* (for garments), *Butea monosperma*, *Azadirachta indica*, *Bauhinia vahlii*; floss of *Calotropis gigantea* used earlier for making shawls, handkerchiefs; *Cannabis sativa*, *Careya arborea Caryota urens*, very strong for tethering elephants; stem of *Imperata cylindrica*; silky floss on seeds of *Ceiba pentandra* used in life saving equipment and as insulators in fridges ; bark of *Cordia wallichii*, leaves of *Corypha umbraculifera*, bark of *Dillenia pentagyna*; leaves and stems of *Saccharum bengalense*, bark of *Erythrina suberosa*, *E. varigata*, *Ficus religiosa*, *F. bengalensis*, *Hardwickia binata*, *Girardinia palmata*, *Grewia subinequalis*, *G. elastica*, *Helicteres isora*, *Hibiscus cannabinus*, *H. tilliaceus;* bark of *Kydia calycina*, ropes used to drag elephants; bark of *Mitragyna parviflora*, *Marsdenia tenacissima*; *Morus alba;* stem of

Musa, bark of *Ougeinia oojeinensis*, *Oreocnide integrifolia*, leaf and aerial root of *Pandanus tectorius*, *Saccharum spontaneum*; leaves of *Sansevieria roxburghiana;* bark of *Soymida febrifuga*, *Sterculia foetida*, *S. urens*, *S. villosa;* stem of *Themeda arundinacea*, *Trema orientalis*, *Urena lobata;* bark of *Ventilago madraspatana*, etc.

Hibiscus sabdariffa and *Girardinia palmata* are also cultivated for fibre.

Agricultural implements

Tool handles, axles, shafts, pounders, mortars, wheels, carts, ploughs, yokes and for sugar and oil pressers are made from the wood of the following plants:

Acacia nilotica, *Adina cordifolia*, *Aegle marmelos*, *Alangium salviifolium*, *Albizzia* spp., *Anogeissus latifolia*, *Artocarpus* spp., *Azadirachta indica*, *Berrya cordifolia*, *Bischofia javanica*, *Holigarna arnottiana*, *Holoptelea integrifolia*, *Hardwickia binata*, *Heritiera minor*, *Capparis decidua*, *Lagerstroemia lanceolata*, *L. speciosa*, *Carallia brachiata*, *Careya arborea*, *Caryota urens*, *Cassia fistula*, *Cordia wallichii*, *Dysoxylon malabaricum*, *Emblica officinalis*, *Feronia limonia*, *Gmelina arborea*, *Grewia subinaequalis*, *Hopea odorata*, *Chloroxylon swietinia*, *Cinnamom glaucescens*, *Mesua ferrea*, *Mimusops elengi*, *Mitragyna parviflora*, *Madhuca longifolia*, *Mangifera indica*, *Lannea coromandelica*, *Melia azedarach*, *Memecylon umbellatum*, *Morinda coreia*, *Morus alba*, *Ougeinia aojeinensis*, *Pongamia pinnata*, *Pterocarpus marsupium*, *P. santalinus*, *Sapindus laurifolia*, *Schleichera oleosa*, *Shorea robusta*, *Soymida febrifuga*, *Strychnos nux-vomica*, *S. potatorum*, *Santalum album*, *Tamarindus indica*. *Tamarix aphylla*, *T. dioica*, *T. troupii*, *Terminalia arjuna*, *T. bellerica*, *T. alata*, *Thespesia populnea*, *Trewia nudiflora*, *Wrightia tinctoria*, *Vitex altissima*, *Xylia xylocarpa*, *Zizyphus mauritiana*, *Z. xylopyra*, *Dendrocalamus strictus*, *Dillenia indica*, *Ficus bengalensis*, *F. racemosa*, etc.

Medicine for man and domesticated animals

Parts of over 3500 wild species are used to cure ailments in man and his domesticated animals: for wounds and as disinfectant (*Panicum antidotale*, *Artemisia maritima*); bronchial troubles (bulbs of *Urginea indica*); blood purification and promoting

lochial discharge (*Mollugo cerviana*); urinary troubles (*Glinus lotoides*); for swellings (root paste of *Corallocarpus epigaeus*); as tonics (*Neurada procumbens*, and *Colchium luteum*, seeds of *Mimosa hamata*, root of *Asparagus recemosus*); pneumonia (*Achyranthes aspera*); diarrhoea (*Podophyllum, hexandrun, Salvia aegyptiaca*); abortion (seeds of *Zaleya redimita*; gonorrhoea and dysuria (*Solanum nigrum, Rivea hypocrateriformis, Pedalium murex*); hydrophobia (*Datura innoxia*); chest pain (*Cuscuta hyalina*); syphilis (*Tephrosia uniflora* subsp. *petrosa*); earache (leaves, seeds, roots of *Cardiospermum halicacabum*); impotency (extract of *Tribulus terrestris*); fever (decoction of *Viola* sp.), stomach complaints of cattle (*Glochidion acuminatum*); cholera (*Zanthoxylum acanthopodium*); acute spasm (*Mucuna monosperma*); rheumatism (*Carum carvi, Inula racemosa*); gastritis and fever (*Achillea millaefolia*); as a vermifuge (*Hyoscyamus niger*); diseases of cattle (*Mentha sylvestris*); spleen disorders (*Capparis spinosa*), hyperacidity (*Nepeta longibracteata*); skin diseases (*Ranunculus hirtellus*); conjunctivitis (*Thalictrum minus*), etc.

Dyes

Yellow dye is obtained from the flowers and leaves of *Memecylon umbellatum*; and from the wood of *Artocarpus heterophyllus* for dyeing robes and silk of Buddhists. Dyes are also obtained from: flowers of *Butea monosperma*, *Caesalpinia* spp., *Carthamus tinctorius*, *Toona ciliata*, *Nyctanthes arbortristis* and *Rhus cotinus*; bark of mango tree; roots of *Morinda angustifolia*, *M. coreia*; rind of *Punica granatum*, bark and leaves of *Symplocos sumuntia* and leaves of *Tectona grandis*.

Dark green dye is obtained from *Anogeissus pendula*. Red dye is obtained from roots of *Ventilago madraspatana*, *Adenanthera pavonina*, *Caesalpinia* sp., *Hedyotis umbellata*, *Morinda coreia*, seeds of *Peganum harmala*, roots and twigs of *Rubia cordifolia*, bark and leaves of *Symplocos sumuntia*. Ochre red dye is obtained from the bark of *Cassine glauca* (syn. *Elaeodendron glaucum*), and from the red pulp of follicles of *Tabernaemontana divaricata*. Brown dye is prepared from the seeds of *Strychnos nux-vomica* and *Kumkum* or *Sindoor* is obtained from the glandular pubescence on the ripe fruits of *Mallotus philippensis*.

The source of black dye is the bark and juice of *Jatropha curcas* and for *Henna* dyes *Lawsonia inermis*. India ink is

prepared from the bark and leaves of *Terminalia catappa*.

Blue dye (Indigo) is obtained from the leaves of *Marsdenia tenacissima*, *Indigofera tinctoria*, *Wrightia tinctoria* and from the roots of *Aleurites moluccana*, *Pterocarpus santalinus*, *Tagetes erecta*, etc.

Abir or *Gulal* is the finely powdered rhizome of *Curcuma zedoaria* mixed with powder of *Caesalpinia sappan*. The powdered root stock of *Hedychium umbellata* is also *Abir*.

Root bark of *Wendlandia tinctoria* is used as mordant in dyeing.

Bixa orellana is cultivated in Mysore and northern parts of India for export. *Oldenlandia umbellata* is also cultivated for dyeing turbans.

Manure

Leaves of *Macaranga indica*, *Adhatoda zeylanica*, *Derris indica* and *Pongamia pinnata* are used for rice fields, leaves of *Delonix elata* for indigo fields and leaves of *Derris indica* for sugar cane fields. *Crotalaria* spp., *Sesbania cannabina*, *Cyamopsis tetragonoloba*, *Vigna unguiculata* are the other wild plants of which leaves are used as manure.

For protection of stored grains

Crushed fruits of *Xeromphis spinosa* are mixed with stored grains.

Protection for clothes from insects

Leaves of *Trigonella foenum-graecum*, *Azadirachta indica* and pieces of root of *Saussurea lappa* are placed with clothes to protect them from insects.

Oil from wild plants

Oil used as luminant and cooking medium is obtained from seeds of *Derris indica*, *Schleichera oleosa*, *Prinsepia utilis* (oil used for cooking in Punjab), *Aleurites moluccana*, *Azadirachta indica*, *Calophyllum inophyllum*, *Carallia brachiata* (oil as cooking medium), *Diploknema butyracea* (vegetable butter as cooking medium), *Garcinia morella* (Kokam butter), *Moringa oleifera*, *Mimusops elengi*, *Shorea robusta* (Sal butter). Oil from bark of *Cinnamomum tamala* is used for the manufacture of soap. Oil is

also extracted from the bark, leaf and seeds of *Cinnamomum zeylanicum.*

Carthamus tinctorius is cultivated and its oil is used in food.

Incense and perfumes

Being fragrant, Sandal (*Santalum album*) and Sal (*Shorea robusta*) wood is burnt in temples; the fragrant wood of *Erythroxylum monogynum* is used in place of sandal wood in Mysore, dried spikes and leaves of *Pogostemon patchouli* are sold in the market. Seed oil from *Abelmoschus moschatus* is used in perfumery; aromatic bark resin of *Aquilaria agallocha* is used in burning sticks (*Agarbattis*), Oleoresin from *Boswellia serrata* and from distillation of flowers of *Canarium odoratum* is used as incense. Other species are: *Michelia champaca*, *Lawsonia inermis*, *Saussurea lappa*, *Skimmia laureola*, *Jurinea macrocephala* (Dhoop plant), etc.

For fragrance in curries

Leaves of *Murraya koenigii* and *Premna latifolia* are added to flavour curries.

Condiments

Wild cardamoms, rind of fruit of *Garcinia cambogia*, ripe seeds of *Zanthoxylum rhetsa* (as pepper and also its aromatic bark), and ripe seeds of *Piper schmidtii* and *P. mullesua* are used by the Todas in the Nilgiris.

Beads

Seeds of *Canna indica*, *Elaeocarpus sphaericus* (*Rudraksha*), *Adenanthera pavonina*, *Caryota urens*, *Coix lacryma-jobi*, *Putranjiva roxburghii*, etc., are used as beads in necklaces.

Combs

The wood of *Buxus wallichiana*, *Carissa carandas*, *Morinda coreia*, *Premna tomentosa*, *Xeromphis spinosa* is used for the manufacture of combs.

For washing and bathing

Seeds of *Anona squamosa* powdered with gram flour are used to wash hair and sandalwood paste in coconut water for bathing.

For brushing teeth

Twigs of *Jatropha curcas*, wood and bark of *Zanthoxylum armatum*, *Indigofera oblongifolia*, *Acacia nilotica* ssp. *indica*, *Fagonia cretica*, *Commiphora wightii*, *Bergia suffruticosa* and roots of *Dicoma tomentosa* are used for brushing teeth.

Colouring eyelids

Soot deposited by burning seed oil of *Aleurites moluccana* is used to colour eyelids.

Detergents

Cotton clothes are washed by wood ash obtained on burning *Avicennia officinalis*, *Haloxylon recurvum* and soda ash of *Salsola maritima*. The pulp of fruit of *Sapindus* spp. is used for washing linen. In Kashmir, silk, pasham and woollen clothes are washed with powdered roots of *Dioscorea deltoides*.

Fruits of *Sapindus laurifolius* are used as a substitute for soap.

Substitute for betelnut

Nuts of wild *Pinanga dicksonii* in Malabar and Travancore and seeds of *Calamus erectus* in Bengal are used by poor people in place of betelnut.

The vegetable lime used in Ceylon in betels is obtained by burning the bark of *Terminalia alata*.

In soaps and glass

Barilla obtained on burning *Salicornia brachiata* is used in the manufacture of soap and glass.

Stuffing beds and pillows

White woolly seeds of *Aerva persica*, *Calotropis procera*, *Bombax ceiba*, etc., are used for the purpose.

To clean well water

Powdered seeds of *Strychnos potatorum* are used to clean well water.

Charcoal plants

Charcoal of *Callicarpa tomentosa*, *Sonneratia caseolaris*, *Acacia catechu*, *Baswellia serrata* is used in iron smelting, of

Aeschynomene indica in gunpowder and of *Calophyllum inophyllum* in gunpowder and fireworks.

Writing material

Daphne papyracea (paper plant) is used for geneological records and deeds. Many early books have been written on leaves of *Corypha umbraculifera.*

For polishing horns

Leaves of *Trema orientalis* are used in polishing horns in Assam and leaves of *Streblus asper* after soaking in water are used for polishing ivory horns.

Gold and silver smithy

The stem of *Abrus precatorius* is used by jewellers to increase adhesion while soldering delicate ornaments. Seeds of *Abrus precatorius* each weighing ± 1.75 gm and seeds of *Adenanthera pavonina* each weighing ± 5 gm, are used as units of weight by goldsmiths and jewellers.

Sacred plants

Quite a few trees such as *Mangifera indica, Santalum album, Ficus religiosa, Saraca asoca, Elaeocarpus sphaericus* are held sacred by Hindus. *Madhuca longifolia* is sacred to the Bhils (their subjugation was caused by the threat to destroy them by the British). Dried inflorescence of *Achyranthes aspera* is used in sacred pyres in Rajasthan desert and *Prosopis cineraria* is held sacred by the Vaishnavas there.

Musical instruments

Wood of *Alangium salviifolium* is used.

Alcoholic drinks

Flowers of *Madhuca longifolia*, rhizome of *Imperata cylindrica*, fruits of *Syzygium cumini*, rhizome of *Cissampelos pareira* are used in the fermentation of rice beer by Kols.

To wrap tobacco

Leaves of *Holarrhena antidysenterica, Careya arborea,* (for Cheroots); *Coix lacryma-jobi, Diosporos tomentosa,*

D. melanoxylon, *Bauhinia racemosa* and *B. vahlii*, etc., are used to wrap tobacco.

Non-alcoholic beverages

A preparation like tea is made from leaves of *Cymbopogon citratus* and *Basella alba* (also cultivated.) Cool drinks are made from hairy seeds of *Lepidagathis bandraensis* and *Ocimum basilicum*, etc.

To increase yield of milk in cattle

Blepharis indica and *Nymphoides cristatum* are fed to the cattle for this purpose.

As cooling screens in hot weather

Screens are prepared from *Alhagi pseudoalhagi*, *Fagonia cretica* and from the roots of *Vetiveria zizanioides* (khas).

Marking of the forehead by Hindus

Paste of Sandalwood, and *Acacia sinuata* (*Shikakai*) is used.

Mortar and plaster

Mucous of seeds of *Aegle marmelos* especially in the construction of wells; juice of *Aloe* mixed with plaster against white ants, and fruits of *Crataeva nurvala* pounded in water make a strong cement.

Unconventional cultivars or wild plants used as cereals

Wild rice, *Oryza rufipogon*, and Bamboo rice (seeds of *Bambusa arundinacea*) are gathered and eaten by poor people. Wild rice is gathered and sold in the market in Orissa and in the Rajahmundry district of Andhra Pradesh. Even coarse confectionary is prepared out of it.

Seeds of *Polygonum convolvulus* are eaten as buck-wheat in Ladakh; of *Euryale ferox* after roasting in sand are dehusked and eaten by the local people; kernels of *Citrulus colocynthis* after roasting are eaten by gypsies in Sind and also made into preserves. This is an important article of diet in the Cape of Good Hope in Africa. Ash of *Anogeissus latifolia* tree, much of which is Potassium carbonate, is an important article of diet among the wild tribes in Nilgiris.

Seeds of *Amaranthus hybridus* ssp. *cruentus* var. *paniculata* are made into flour and eaten in Coimbatore district and by the Nilgiri-Badagas, who also cultivate it; seeds of *Vigna trilobata* are eaten by the poor people and bread made from seeds of *Vigna mungo* is used in religious ceremonies; seeds of *Coix lacryma-jobi* and the pith of *Saccharum bengalense* is eaten by the poor in Punjab.

Pollen of *Typha elephantina* is eaten in Sind; seeds of *Panicum atrosanguineum* are eaten in Punjab; *P. hippothrix* in Bombay and the Deccan; and *P. paludosum* by the hill tribes. Seeds of wild and cultivated *Setaria glauca*, *S. verticillata* and of *Lasiurus hirsutus* are consumed as food.

Food during famines and scarcity

Seeds of *Setaria verticillata*, *Citrulus colocynthis*, *Ephedra foliata* in the Rajasthan desert; seeds of *Acacia* and wild yam, *Hyphaene thebaica*, and *Balanites aegyptiaca* in the Nilgiris; underground parts, and rhizomes of *Amorphophallus commutatus*, *Arisaema concinnum*, *Asparagus sarmentosus*, *Asphodelus tenuifolius* and *Borassus flabellifer*, *Butea monosperma*, *Crinum defixum*, *Cyperus rotundus*, *Dioscorea* spp. *Hedychium coronarium*, *Kaempferia scaposa*, *Solena heterophylla*, *Nymphaea alba*, *N. nouchali*, *Vigna adenantha*, *Pouzolzia zeylanica*, *Smilax zeylanica*, *Typha angustata*, *Typhonium bulbiferum*, *T. divaricatum*, *Scirpus tuberosus* and kernels of *Tamarindus indica*.

Seeds of *Brachiaria deflexa*, *B. reptans*, *Chrysopogon fulvus*, *Dactyloctenium aegyptium*, *Echinochloa colonum*, *E. crus-galli*, *E. stagnina*, *E. hirsutus*; *Eragrostis tremula*, *Ischaemum rugosum*, *Oryza rufipogon*, *Sacciolepsis interrupta*, *Setaria glauca*, *S. pallidefusca*, *Paspalidium flavidum*, *Pennisetum alopecuroides*, *Panicum*, *trypheron*, etc., are used as famine foods.

Feeds and fodders for domestic animals

(a) *Birds and poultry*. Seeds of *Cannabis sativa*, *Phalaris arundinacea* and other species of *Phalaris* and *Sorghum* etc.

(b) *Cattle*. *Pterocarpus marsupium* in Bombay; *Eleusine compressa*, *Eragrostis ciliaris*, *E diarrhena*, *E. gangetica*, *E. tenella*, *E. tremula*, *E. viscosa*, *Eremopogon foveolatus* *Hackelochloa*

granularis, *Heteropogon contortus*, *Polypogon monospeliensis*, *Indigofera cordifolia*, *Vigna lobata*, *Sehima nervosum*, *Setaria verticillata*, *Sorghum halepense*, *Tetrapogon tenellus*, *Panicum antidotale*, *Echinochloa colonum*, *Lasiurus ecaudatus*, *L. hirsutus*, *Tragus roxburghii* in Rajasthan, Madhya Pradesh and Maharashtra.

(c) *Camel. Lasiurus ecaudatus*, *L. hirsutus*, *Panicum antidotale*, *Crotalaria burhia*, *Panicum turgidum*, *Suaeda fruticosa*, *Haloxylon salicornicum*, *Clerodendrum phlomoides*, leaves of *Acacia nilotica*, *Schoenefeldia gracilis*, etc.

(d) *Horses. Echinochloa colonum*, *Citrullus colocynthis*, *Melilotus indica*, *Medicago sativa* (also cultivated in desert), *Avena* spp., etc.

(e) *Sheep. Citrullus colocynthis*, *Indigofera oblongifolia*, *Schoenefeldia gracilis*, *Lasiurus hirsutus*, etc.

(f) *Goats. Panicum antidotale*, *Lasiurus ecaudatus*, *Indigofera cordifolia* and leaves of *Prosopis cineraria*, *Pithecellobium dulce*, *Acacia nilotica*, etc.

(g) *Elephants. Typha elephantina.*

(h) *Pigs.* Rhizomes of *Cyperus rotundus*, *Gynura cusimbua*, etc.

Some uses of wild plants common to different countries

The following are some examples of common wild plants used in various parts of the world and also in India.

Shoots of *Dendrocalamus* in China and India; leaves and flowers of *Acacia sinuata* in Burma and India; leaves of *Capsella bursa-pastoris* in Punjab and China; are gathered and eaten. Young leaves of *Ficus palmata* are eaten in the Punjab, Mexico, Cuba and Sumatra.

Seeds of *Prinsepia utilis* are gathered for oil used for cooking in both the Punjab and China.

Rhizome of *Nelumbo nucifera* is eaten in China and India.

Seeds of *Citrullus colocynthis* are an important article of diet in India and Africa (Cape of Good Hope); seeds of *Sorghum halepense* and *Dinochloa scandens* in the Philippines, *Echinochloa colonum* (Jungle rice) in Mariana islands and *Panicum turgidum* in the Sahara are also eaten in India, though only in times of scarcity.

Digitaria exilis and *D. eburnea* are cultivated in Africa and the grains used as food, *Digitaria cruciata* var. *esculenta* is

grown in India by the Khasi tribes of Meghalaya for its grain (wild forms of *D. cruciata* occur in mountainous regions of north-west India and China, but the *esculenta* form is only in Khasi Hills, Assam. It has bolder grain and the plant is taller with longer spikes).

Conclusion

Whereas the poor man and the tribals have been all along experimenting with wild plants, the sophisticated man has adopted a few of them and has ever since been trying to improve upon them and the efforts today seem to continue mainly in that direction. Improved cultivars of the superior cereals (wheat, rice, etc.), oil and fibre plants (cotton, jute) have been created which are disease-resistant and high yielding, requiring a large amount of specially created conditions like artificial fertilisers, etc. The gradual introduction of these new techniques and highly evolved cultivars into regions populated by tribals and poor people, is posing dangers to their association with the traditionally adapted wild plants. In course of time, this will destroy the wealth of information on useful wild plants.

It is not only essential to conserve this wealth of information but also to apply modern biochemical and agricultural techniques to determine the utility of adaptability of the most useful among them to meet modern requirements. A shift in our staple diets from major or superior cereals to minor or inferior cereals which are more nutritive and to root crops is also highly essential. The adaptation of potato as a staple by many advanced countries is an example. Likewise, vegetable fats, butter and oil, vegetable fibres apart from those of cotton, several kinds of wild fruits, etc., are sure to provide new resources.

With the adaptation of wild indigenous germ plasm and its improvement, the socio-economic and industrial development of the backward and tribal areas can be achieved without changing their food habits and their local cottage industries. As an example is the vast stretch of land in the Ganjam and Koraput regions of the eastern ghats of Orissa, populated by tribal people practising shifting cultivation. The tribals here are great fruit-lovers and worship fruit trees as deities. Wild orange plants with sweet fruits grow here. They are now systematically cultivated. There are over 3000 hectares under Citrus plantations

and the produce is about 3 million oranges, which compares with the best areas of Citrus cultivation elsewhere. Usefully engaged in this, the tribals no longer fell the original forests for shifting cultivation (*Podu*). These tribals have been channelised into more useful and economic pursuits through their own indigenous wild plants.

The Indian sub-continent provides ample scope toward the search for germ plasm among its thousands of wild plants. Among several wild plants, *Coix lacryma-jobi* may be mentioned as an example. It is nutritively richer than any of our major cereals. It is also cultivated by the tribals in Assam. It can be improved upon suitably and adapted on a large-scale. Likewise, the cultivation of some of the yams should be encouraged and their use as food popularised. Scores of such examples from the lists of plants in the text can be selected for the purpose. Similarly, the bio-assay of a large number of plants used for medicinal purposes is highly essential to develop the indigenous sources for the utility of natural products against the synthetic ones. If this can be achieved, the object of ethnobotanical surveys would have been realised.

Wild plants mentioned in folklore have over the millennia endeared themselves to man to the extent that they have become a part of his culture apart from their mere importance in his subsistence upon them. Their wider adaptability would help enlarge this cultural context, and this adaptability would be spontaneously accepted without causing psychological and cultural reactions. This would also be free from hazards accompanying the introduction of highly bred cultivars requiring large amounts of artificial fertilisers.

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5

PLANTS IN FOLK MEDICINE OF THE HIMALAYA

Rajendra Gupta[1]

ABSTRACT

The Himalayan ranges are inhabited by a large tribal population, often with their distinct way of life, traditions, dialects and cultural heritage. The Himalaya have bestowed them with vast, varied and even endemic plants. The tribals have learnt to utilise local herbs for different ailments after centuries of trials, often at the risk of loss of human life. Many tribal beliefs forbid them to unravel the virtues of the plants to outside world. But, it is also true that till recent little concerted effort had been made to document this knowledge by detailed ethnobotanical surveys.

Some folklore medicines of the region have proved efficaceous after detailed pharmacological and clinical trials. Rauvolfia serpentina roots are a classical example. Coptis teeta is another plant which has given encouraging results. The oil of seed kernel of Hydnocarpus kurzii, from upper Assam and Tripura hills, has proved useful in the treatment of leprosy and skin diseases. The roots of Nardostachys grandiflora have provided a safe sedative.

The Himalaya comprise a large mountainous system which stretches over 3000 km in length from its junction with the Karakoram ranges in the west to the Arakan mountains on the Assam-Burma border in the east. It has an average width of about 300 km, rising from the foothills in the south to the northern

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snow-clad peaks in the inner Himalayas, penetrating into Tibet. In general the eastern Himalayas are distinguished from the western part by higher monsoon rainfall, scanty snowfall and higher temperature and humidity. The vegetation of Himalaya can be divided altitude-wise into distinct tropical, temperate and alpine. The flora combines Mediterranean, West Asian, Tibetan, Japanese and Burmese elements and therefore is considered as one of the richest repositories of diverse plant life. It has a large component of endemic plants.

The Himalaya are inhabited by a large population, often with their distinct way of life, beliefs, traditions, dialects and cultural heritage. The native folks have learnt to utilise indigenous plants in various ways; many of these plants have come to be used in the treatment of different diseases after centuries of trials, often errors, at the risk of human life. Much of this wealth is preserved as an unwritten materia medica of the tribal folk. Due to the lack of communication (which developed mostly from north to south), exchange amongst these ethnic groups was limited and many tribal beliefs forbid them to unravel the medicinal virtues of plants to the outside world. In recent years, this knowledge is slowly fading because of increase in communication and health services. It is therefore most appropriate that there is now much attention on the use of plants in folklore and folk-life. The folk-medicine of the Himalaya has gifted many plant drugs to modern medicine such as *Rauvolfia serpentina* (for high blood pressure), *Tylophora indica* (for asthma and whooping cough), *Viola serpens* and *Adhatoda zeylanica* (for bronchitis), *Nardostachys grandiflora* (sedative), *Gentiana kurroo* (bitter tonic and febrifuge) and many others. It promises to yield more plant drugs.

Several recent botanical collectors in Himaylaya have listed plants of medicinal value; these reports usually indicate plant distribution in a particular region and reproduce their therapeutic values from standard Ayurvedic and Unani textbooks. Therefore, many of these survey reports have contributed little to new knowledge on folk medicine. More expeditions have been made in the western sector, and a large percentage of crude drugs sold in the Indian bazaars come from this region. In contrast, much less is known on plants in folk-life in the eastern sector and wherever such information is known, more

efforts are needed to verify the claims on efficacy of the drug and locate their distribution for economic collections and utilisation.

The author's collections have been limited mainly to Himachal Pradesh and north-western Uttar Pradesh; a part of this work has been published (Gupta, 1961, 1964 and 1968). He has therefore taken liberty to utilise published reports of other workers as well. Of these, mention may be made of collections made by Kazmi (1953) and Kazmi and Siddiqui (1953) in Pakistan sector, Aitchison (1868) in Lahoul, Ahluwalia (1952) in Kangra, Rajkumar Gupta (1960, 1962) and Shah and Joshi (1971) in Garhwal and Kumaon hills. The author has also utilised Medicinal Plants Bulletin (1970 on Nepal), Medico-botanical survey reports of Arunachal Pradesh (1976) and publications of Biswas (1956) and Rolla Sheshagiri Rao (1961) on the eastern Himalaya.

Thus the attempt here is to give an account of plants whose use is still limited to natives in the region, and plants which have come to be used in Ayurvedic and Unani materia medica, are excluded.

In the arid temperate hills of Lahoul, Aitchison (1868) has reported use of thick tap-roots of *Codonopsis ovata* and leaves of *Myricaria elegans* as emollient, applied to bruises and swollen joints. A decoction made from fruits of *Hippophae rhamnoides* is used to relieve lung complaints, and roots of *Gentiana tenella* are given as febrifuge in periodic fever. In the erstwhile state of Kalat (Pakistan), Kazmi (1953) recorded use of leaves of *Anthemis gayana (Puinphali)* to cure pain in chest and a decoction of stem of *Boucerosia aucheriana* (*Marmutk*) to relieve heat and problem of wind in stomach complaints. In the Astore and upper Guraiz valleys (Pakistan) Kazmi and Siddiqui (1953) have found use of tubers of *Paeonia emodi* (*Mid*) in uterine and bladder troubles. The leaves of *Colutea nepalensis* and berries of *Ribes orientale* are used as purgatives; root of *Senecio jacquemontiana* is used as nervine tonic whereas root of *Taraxacum officinale* is widely used in kidney and liver disorders.

In Himachal Pradesh, the author recorded use of roots of an alpine hairy herb, *Onosma hispida*, as alterative and stimulant and root of *Macrotomia benthami*, another alpine

herb, in the treatment of eye complaints. The use of leaves of *Rhododendron campanulatum* is common as *nasbar*, given in cold and hemicrania. The flowering tops of *Thymus serpyllum*, *Elsholzia fruticosa* and *Perilla ocimoides* are considered warm and carminative and used in flavouring cordial drinks. The leaves of *Roylea cinerea* (*Kaur*) are intensely bitter and are given in periodic fever and for purifying blood; recent studies on this plant have shown it to contain a group of glycosides, resembling those obtained from *Digitalis* foliage. Leaves of *Ajuga bracteosa* are commonly given in syphletic conditions and a paste made of bulbs of *Arisaema flavum* in oil, is applied to eczema and other skin infections.

Bark of *Litsea glutinosa* (*Hadran*) has been noticed to be very efficaceous in treatment of skin diseases including boils emitting foul odour. *Myrsine africana* (*Bai-bidang*) is employed as cathartic and vermifuge and is given in colic pain. The entire aerial parts of *Boeninghausenia albifera (Pissumar)* are used to kill flee, lice and other insects. In Almora hills, the author has seen use of an infusion of leaves of *Achyranthes aspera (Chirchira)* in alcohol for controlling and curing leucoderma. The roots of *Polygonatum verticillatum*, *P. multiflorum* and tubers of *Orchis latifolia* are sweet in taste and are used as aphrodisiac and as nervine tonic. Insect galls formed over leaves of *Pistacia integrifolia* (*Kakra-singhi*) are collected and used as expectorant to relieve cough and asthmatic conditions. Similarly, a powder made from yellow hairy glands present on ripe fruits of *Mallotus philippensis* (*Kamla*) is given to expel tape-worms. The use of decoction of root of *Acorus calamus* and *Swertia chirayita* is a household medicine against intermittent fever all over this tract. A decoction of *Asteracantha longifolia (Talmakhana)* is given as diuretic in dropsical affections and in diptheria. The fruits of *Piper cubeba (Kabab chini)* enter into prescriptions used in treatment of whooping cough and gonorrhoea. *Plumbago indica* roots are considered as powerful sudorific medicine and roots of *Bergenia ligulata* (*Pathar-phor*) is employed for dissolving and expelling pieces of stones from kidney. In Chamba district the rhizome and fibrous roots of *Selinium vaginatum* (*Butkesi*) are commonly employed in preparation of local drinks stored for maturation.

The rhizome and roots of *Valeriana jatamansi* (*Musk-bala*) are considered as aromatic sedative, used in hysteria and epilepsy. This species is reported to contain 4 times more of voleptorites (2.0%) than the European *V. officinalis*, now used in medicine. Rajkumar Gupta (1960) found the use of root-bark of *Picrasma quassioides* as febrifuge and of the roots of *Stephania hernandifolia* for dyspepsia. The oil of seeds of *Anemone obtusiloba* is reported to be used for rheumatism and the crushed leaves of *Siegesbekia orientalis* are applied to heal ulcers and sores. The seed and seed oil of *Origanum vulgare* (*Mir-jan-josh*) is considered a warm aromatic tonic, given to promote regular menstrual flow and the herb of *Elaeagnus parvifolia* (*Gaozwain*) is given for pulmonary affections. A decoction made from *Viscum album* is given for enlarged spleen.

In central Nepal Himalaya, root of *Pavetta indica* is considered as aperient and diuretic for visceral obstructions and dropsical affections. An oil extracted from seeds of *Guizotia abyssynica* is used for rheumatism. Flowers of *Onosma echioides* are used in preparation of a cordial drink whereas fruits of *Elaeocarpus sphaericus* (*Rudraksha*) are considered as sacred and used to control epileptic fits. The bark of *Melastoma malabathricum* is used in healing wounds and that of *Symplocos paniculata* is astringent, used as gargle for firmness of spongy and bleeding gums. The root-stock of *Dendrobium macraei* is considered stimulant, demulcent and tonic, whereas root-bark of *Euonymus tingens* is given in dyspepsia. Poultice of leaves of *Argyreia nervosa* accelerates healing of wounds and a paste of flowers of *Osbeckia nepalensis* is applied to soothe boils on tongue. The roots of *Hedychium spicatum* (*Kapur kachri*) are considered as stomachic, carminative, stimulant, emmenagogue, and useful for liver complaints and diarrhoea. The roots of *Iris decora* are used against bilious obstructions and to cure small sores and pimples.

A paste made of the tubers of *Hypoxis aurea* is applied to injuries and swellings in Arunachal Pradesh. A decoction of root of *Hydrangea stylosa* is given in the form of a drink for severe cold. The seeds of *Entada pursaetha* are used in liver complaints and its bruised leaves are applied on cuts to stop bleeding. *Aristolochia indica* (*Kiramar*) and *A. bracteolata* are used for stimulation of phagocytosis; these herbs contain

aristolochic acid and might be good substitute of *A. clematitis* used in Europe.

Biswas (1956) recorded use of *Ephedra saxatilis* var. *sikkimensis* in asthma, though on chemical examination, it was found to contain traces of ephedrine only. The *Drymaria cordata* herb is given for hay fever and cold head. *Dichroa febrifuga* roots are used for malaria, and *Elsholtzia blanda* for treatment of eczema. The cooked roots of *Rheum webbiana* and *Paederia foetida* are considered wholesome tonic for convalescent patients. The young inflorescence of *Urtica ardens* is considered invigorating agent, given after child birth. *Cimicifuga foetida* is regarded as a powerful sedative, useful for neuralgia and rheumatic affections. Bark of *Myrica esculenta* is given as astringent in cholera.

Rolla Seshagiri Rao has recorded use of watery liquid contained in pitchers of *Nepenthes khasiana* (before opening of leafy lids) as a remedy for urinary troubles. The fruits of *Skimmia laureola* (*Dissing*) are used for gastric pain. The tiny dried starchy bulbs of *Fritillaria cirrhosa* (*Yathu*) are used for many ailments in the Lohit Frontier Division. Rao has also recorded use of rhizomes of *Astilbe rivularis*, *Iris* sp., roots of *Daphne papyracea*, *Selinum candolii*, stems of *Viscum articulatum* and *Clematis montana* in different diseases by tribals in the eastern region. The herb (and tubers) of *Coptis teeta* (*Arong*) has currently a large demand in Japan and Hong Kong and is extensively collected from this region. Although the root of this species is found to be rich source of sulphate, the collection of the entire herb is said to be made for use in place of *Coptis coinsea* used for tuberculosis, perhaps in traditional Chinese medicine.

While confirmation of claims on efficacy or otherwise of these plants can be made only after detailed pharmacological, chemical and clinical investigations, there could be no two opinions on utility of ethnobotanical surveys in discovering new plant drugs for wider use. However, an analysis of available literature clearly brings out that ethnobotanical surveys of the Himalaya have been very few. This is obvious for many reasons; it demands the explorers to spend longer period in the region (than on botanical expeditions) and to have fair background of language and cultural heritage of the tribes to

win over their confidence before sharing knowledge on their plant wealth. It is hoped that scientists will appreciate importance of this work and make regular ethnobotanical studies for the purpose of knowing plants in folk-life and folk-medicine of the Himalaya.

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6

OBSERVATIONS ON ETHNOBOTANY OF THE TRIBALS OF CENTRAL INDIA

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ABSTRACT

Central India is one of those regions in India where the tribal populations and forest-dwellers form a considerable part of the population. Studies were undertaken on the ethnobotany of these people and for this field work, literature survey as well as a scrutiny of the herbarium material were undertaken.

The study brought to light, numerous less known uses of plants and interesting data on beliefs and taboos about plants.

Several plants in these areas have potential of better economic exploitation, e.g., organised trade in *Bauhinia vahlii*, *Thysanolaena maxima* and *Curcuma angustifolia*, etc.

Seeds of *Bauhinia vahlii* are very rich in protein, almost comparable to almonds. They occur in large quantities and go waste; there is scope of popularising these nuts for urban consumption. There is also scope of cottage industries based on Emblic myrobalan.

One of the largest concentrations of tribal people in India is in the hilly tracts of Madhya Pradesh. They form about one-fourth of the population of the State and in certain parts, such as in Mandla, Bastar and Balaghat districts, the tribals constitute even three-fourths of the population.

The studies included the total relationship of the tribals with plants—such as wild plants used for food, medicine, fibre, fish

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poisons, luminants, brooms, house-building, tannins, dyes; plants associated with social, religious, mythological, magical and recreational activities; wild strains of cultivated crops grown by tribals, the indigenous methods of agriculture including shifting cultivation, the sacred trees and groves, concept and practice of conservation of local plant resources, and preferences, taboos and avoidances about plants.

The main tribe in Central India, particularly the State of Madhya Pradesh, are the Gonds. Depending on their culture and beliefs etc., they are further divisible into several tribes like Maria Gonds, Muria Gonds and Baigas. Further, the habitat of the tribes also distinguishes them, such as the Hill Marias and the Marias of plains. The ethnology of these tribals has been studied by Elwin (1947, 1950) and Grigson (1949).

The flora of the several regions or districts of the state being to some extent different, and particularly the great difference in the plains and the hills, the knowledge about uses of plants is not unoften endemic.

Plants in folk medicine

Use of plants in folk medicine is very prevalent in Central India (Jain, 1963, Jain and Tarafder, 1963). More than one hundred plants were reported to be commonly used in medicine in the district of Bastar (Jain, 1965a). Some plants are used singly, whereas others are used in mixture Similarly, certain plants were considered useful in only one disease whereas several had multiple uses.

Many medicinal uses reported by tribals of Bastar appeared to be unknown or little-known outside their community. Examples of a few such plants are given below:

Cassia tora (*Charota*): Tender leaves eaten to prevent skin diseases.

Combretum decandrum (*Ainti*): Oil from seeds applied on eczema.

Flacourtia indica (*Kakai*): Bark applied on eczema.

Nyctanthes arbortristis (*Harsingar*): The inflorescence and young fruits pounded in water; this is used for relieving cough.

Polygonum plebejum (*Chatibhaji*): The plant eaten as a vegetable to promote lactation.

Wild edible plants

The tribals in Central India raise a number of agricultural crops. Most of them practice settled agriculture now. But they do supplement their food with a number of wild edible plants, particularly in times of scarcity (Jain, 1964).

Depending upon the nature of different species, the tribals consume fruits, seeds or grains, leaves, roots or tubers, stem or bark, flowers, as well as whole plants.

The whole plants or their products are used variously such as vegetables, raw fruits (dessert), nuts, beverages or drinks, pickles, oil seeds, grains or condiments.

Roy and Rao (1957) have studied the nutritional aspects of the diet of the Murias.

Some of the wild plants eaten by the Gonds and Santals of Central India are not widely known to be edible. Examples of a few such plants are given here:

Annona squamosa (*Sitaphal*): The ripe fruits are well known as dessert fruit. In Central India, yong unripe fruits roasted and eaten; flowers also eaten.

Bauhinia purpurea (*Koinar*): Leaves used as vegetable.

Bauhinia vahlii (*Siadi*): All over the region, the seeds roasted and eaten. Very abundant, robust, climbing plant. The seeds have potential of becoming popular in urban markets as a less expensive protein-rich nut.

Curcuma angustifolia (*Tikhur*): Tubers largely eaten after processing. Common in the region; wild as well as cultivated.

Euphorbia elegans (*Dudhi*): Herb used as vegetable.

Grewia tilaefolia (*Dhaman*): Tender leaves eaten as vegetable.

Indigofera pulchella (*Jhiler*): Flowers cooked and eaten as vegetable.

Moringa oleifera (*Sahajna*): The fruit is drumstick, the well-known vegetable. Tribals use flowers and leaves also as a vegetable.

Smilax prolifera (*Ramdatun*): Young unripe fruits used as a vegetable.

Xylia xylocarpa (*Irul*): Seeds from ripe fallen fruits collected, roasted in an earthen pot and eaten.

Surprisingly, fruits of the commonly occurring plant *Emblica officinalis* (*Amloki*) are not eaten at all places, and a lot of fruits fall and go waste.

Fibres

Bauhinia vahlii is the most commonly used plant. Its bark provides very strong fibre, and this fibre is put to multifarious uses (Jain *et al.*, 1973). This fibre needs further study and full exploitation.

Thysanolaena maxima grows very commonly and is exploited for brooms.

The trade is chiefly in hands of contractors. Better profits can accrue to local collectors through more organised trade.

The fibre from *Sterculia urens* is used very commonly for covering as insulating material on local water bottles (made from gourds), etc.

Other material culture

A number of plants are used as fish poisons. Young boys are often seen with their specially designed baskets stupefying and catching fish. The common plant products used for this purpose are the fruits of *Cleistanthus collinus* and *Sphaeranthus indicus.*

Several seeds are used for obtaining luminant, lubricating and edible oils.

Seeds of *Celastrus paniculata*, *Madhuca longifolia*, *Ricinus communis*, *Mallotus philippensis*, *Schleichera oleosa* and *Semecarpus anacardium* yield oil for various purposes.

Shorea robusta, *Sterculia urens* and *Pterocarpus marsupium* provide gums useful in medicine and industry; the local tribals usually collect gum for contractors.

Two very rich sources of tannin in the area are *Cleistanthus collinus* and *Terminalia chebula.* Both plants are common in the area, but *Cleistanthus* does not seem to have been exploited for tannin. The tannin in this plant is reported to be of good quality.

A number of timbers are used for making musical instruments; particular mention can be made of *Caryota urens*, *Gmelina arborea*, *Pterocarpus marsupium*, *Mangifera indica*, *Lagerstroemia parviflora* and *Terminalia alata* for drums, *Buchanania lanzan* for a stringed instrument and bamboos for flutes (Jain, 1965b). An interesting observation in the area was that the timber from *only naturally fallen* trees or branches of *Buchanania* was considered suitable for the stringed instrument.

Much more remains to be studied about the uses of plants among the tribals of this region. The area is full of challenges for young ethnobotanists of India.

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7

NOTES ON ETHNOBOTANY OF THE ORAON AND KORWA TRIBES OF MADHYA PRADESH

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ABSTRACT

The paper deals with an ethnobotanical study of Oraon and Korwa tribes of Surguja and Raigarh districts, Madhya Pradesh in Central India. These tribes live in the interior regions of the forest and are mainly dependent upon the forest flora for their livelihood. They believe in supernatural powers and use folk medicines in the treatment of their diseases and ailments. They make a number of herbal preparations, and consume roots, tubers, leaves, flowers and fruits of various plant species. The present survey shows that these tribes utilize 75 species in ethnomedicine, 25 species for food, 10 species for material culture (cordage, basketry, mats, brooms, pens, bow, food plates, etc.), 4 species for dyes, 10 species for oils and 15 species for miscellaneous uses. The economy of the tribals has been adversely affected due to ban on shifting cultivation and dwindling of forests.

Introduction

The Oraon, an important Dravidian tribe of Madhya Pradesh, is concentrated principally in the Raigarh and Surguja districts of Madhya Pradesh. They are also commonly known as Dhangar (Dubey & Bahadur 1966). The Raigarh district lies between 21°45' and 22°35'N lat. and between 83°35' and 84°48' E long. while Surguja district is located between 22°38' and 24°6'N lat.

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and 82°31 and 84°5′E long. in north-eastern parts of Madhya Pradesh (Ph. 7.3). Like the Gonds, the Oraons are also a dominant tribe in their region (Ph. 7.1). The total population of Oraons in Raigarh and Surguja districts is about 3 lakhs (Raizada, 1984). Totemism forms the fundamental feature of the Oraon social organization. The tribe is divided into a number of exogamous totemic clans. The Oraons have come under the impact and influence of outsiders, in particular the Christian missionaries. This has resulted in a fairly sizeable number of Oraons becoming Christians. The Oraons who have come under the influence of Hindu religion worship Hindu gods and goddesses like Vishnu, Parvati, Ganesh, Ram and Sita. Consequently, some of the traditional tribal deities have either lost their importance or have been forgotton. The Oraons have their own language called Kurukh which is quite different from Gondi, through both of them are regarded as belonging to the Dravidian family (Russell & Hira Lal, 1975). The Korwa tribe belongs to the Kolarian family of the tribes. The tribe is concentrated principally in the eastern region of Bilaspur Surguja and Raigarh districts (Ph. 7.2). Their total population is only about 42,000 (Raizada, 1984; Srivastava, 1984). The Korwa dialect is most closely related to Asuri and resembles Mundari and Santali. The principal sub-divisions of the tribe are the Diharia or Kisan Korwas who live in villages and cultivate, and Pahari Korwas of the hills, who are also called Benwaria from their practising *Bewar* or shifting cultivation. The tribe is also divided into totemic exogamous clans. The Korwas worship *Dulhadeo*, the bridegroom god of the Gonds. In Surguja, their principal deity is *Khuria* Rani, the titular blood-thirsty goddess who requires animal sacrifices. *Thakur Deo* is considered to be the corn god, and he protects the village from diseases and epidemics. The economy of Pahari Korwas is forest-based and with the dwindling of forests and ban on shifting cultivation, their economy has been adversely affected. Both the tribes believe in supernatural powers and use folk medicines in the treatment of their diseases. They also utilize a number of herbal drugs, and consume leaves, tubers, bulbs, flowers and fruits of various species as food in times of emergency and drought. Besides, they utilize many plant species for dyes, oils, fish-poison, basketry and socio-religious ceremonies.

7.1 Oraon tribal of Dhauthatoli village in Raigarh district, Madhya Pradesh.

7.2 Korwa tribals of Mahua village, Raigarh.

Fig. 7.3. Map of Surguja and Raigarh districts in Madhya Pradesh.

Vegetation

Physiographically, the zone consists of numerous hills and undulating plateaus. The soil is generally laterite and clay. The forest comprises of semi-evergreen and deciduous forest species. The forests are classified into two groups, i.e. Sal and mixed forests (Haines 1921-24). The 'Sal' (*Shorea robusta*) is the predominant species in the area. The other important species are: 'Saja' (*Terminalia alata*), 'Amla' (*Emblica officinalis*), 'Bahera' (*Terminalia bellirica*), 'Harra' (*T. chebula*), 'Char' (*Buchanania lanzan*), 'Kusum' (*Schleichera oleosa*), 'Imli' (*Tamarindus indica*), 'Mahua' (*Maduca longifolia var. latifolia*), 'Bija' (*Pterocarpus marsupium*), 'Ghont' (*Zizyphus xylopyrus*), 'Ghingan' (*Lannea coromandelica*), 'Mohlain' (*Bauhinia vahlii*), 'Kewalar' (*B. purpurea*) and 'Bhilwa' (*Semecarpus anacardium*). The wild animals include Chital, Deer, Hare, Jackal, Langoor, Wild hen, Wolf and Sambhar. Paddy and some minor millets are grown in the districts.

Methodology

The ethnobotanical surveys were conducted during the months of November and December 1984, and September 1986 in several tribal villages, *viz.* Basantpur, Kundi, Kanakpur, Mansukh, Pal, Tatapane, Nawagaon, Chandi, Serewal in Surguja district, and Salba, Gamharia, Dhauthatoli, Dhokatoli, Mahua, Kaputola, Madhopur, Dharamjagarh, Aeppu, Sisrangha, Borrow, Pendi, and Pandripane in Raigarh districts of Madhya Pradesh. Several plant species of ethnobotanical importance were collected, identified and documented along with data on ethnobotanical uses gathered from tribal chiefs and other important informants of the villages, and their medicine-men called 'Dewar'. These species are preserved in the Ethnobotanical Herbarium of National Botanical Research Institute, Lucknow and are cited under EBH numbers. Local names are given in single inverted commas.

Enumeration of plants of ethnobotanical importance

1. *Abrus precatorius* 'Karjari' (Fabaceae). *Loc.*: Kundi (Surguja)

The decoction prepared from fresh roots (50 gm) is used three times daily in abortion (EBH 3551).

2. *Acacia catechu* 'Khair' (Mimosaceae).
Loc.: Madhopur (Raigarh).

The heartwood is used for making 'kattha'; the latter used as a dye. The wood is also used as firewood and timber (EBH 3560).

3. *Achyranthes aspera* 'Chirchita' (Amaranthaceae).
Loc.: Dhokatoli (Raigarh).

The powder (10-15 gm) is used three times daily in dysentery. The root ash (10-15 gm) is given to children in cough. The root decoction is also used in scorpion stings (EBH 4766, 3507).

4. *Adina cordifolia* 'Haldu' (Rubiaceae). *Loc.*: Surguja.
The wood is used as firewood and timber (EBH 4715).

5. *Albizia lebbeck* 'Khairi' (Mimosaceae).
Loc.: Dhokatoli (Raigarh).

The fresh decoction (50 ml) is used three times daily in stomach trouble and dysentery (EBH 3455).

6. *Alternanthera sessilis* 'Ghundaru'; 'Gurubhaji' (Amaranthaceae). *Loc.*: Raigarh.

The whole plant paste mixed with 'jaggery' is used on bone fracture and swellings. The plant is also used in blood diseases and unconsciousness. The leaves are used as vegetable (EBH 3421, 4732).

7. *Amaranthus viridis* 'Bhaji-khere' (Amaranthaceae).
Loc.: Sisrangha (Raigarh).
The leaves and twigs are used as vegetable (EBH 4723).

8. *Ampelocissus latifolia* 'Dhodo' (Vitaceae).
Loc.: Gamharia (Raigarh).

The root paste is used on old wounds. The ripe fruits are eaten (EBH 4717).

9. *Argyreia nervosa* syn. *A. speciosa* 'Masbardhi' (Convolvulaceae). *Loc.*: Sisrangha (Raigarh).

The root poultice is used in healing wounds and muscular pain (EBH 3428).

10. *Asparagus racemosus*. 'Karangi' (Liliaceae).
Loc.: Surguja, Raigarh.

The root powder (50 gm) is used five times daily in urinary troubles. The root decoction (50 ml) is used three times daily for 15 days in delivery as a tonic. It is also eaten by Korwa tribe (EBH 4719, 3453).

11. *Atylosia scarabaeoides* 'Banherwa, Daruradc' (Fabaceae).
Loc.: Aeppu (Raigarh).
The plant decoction (100 ml) is used as a tonic after delivery. The fresh leaf paste is applied on swellings of leg. The pods are also eaten (EBH 4739, 3446).
12. *Bauhinia purpurea* 'Keolarbhaji' (Caesalpiniaceae).
Loc.: Sisrangha (Raigarh).
The stem bark decoction (50 ml) is used three times daily in body pain and fever. The young leaves and buds are cooked as vegetable (EBH 4727, 3585).
13. *B. vahlii* 'Sehar' (Caesalpiniaceae).
Loc.: Sisrangha (Raigarh).
The root paste mixed with 'jaggery and 'ghee' is used on bone fracture. The seeds are roasted and eaten. The leaves are used for making plates by Korwa tribe (EBH 4716).
14. *Bombax ceiba* 'Semal' (Bombacaceae).
Loc.: Basantpur (Surguja).
The root decoction is used in urinary troubles (EBH 3411).
15. *Butea monosperma* 'Palas' (Fabaceae). *Loc.*: Kundi (Surguja).
The root decoction is used in urinary troubles. The bark decoction is used in loose motions (EBH 3530).
16. *Carissa spinarum* 'Karonda' (Apocynaceae).
Loc.: Gamharia (Raigarh).
The root paste (20-50 gm) is mixed with milk and used three times daily in acute pain. The root decoction (50-100 ml) is used in fever. The ripe fruits are eaten (EBH 4761, 3594).
17. *Cassia occidentalis* 'Dhendheni' (Caesalpiniaceae).
Loc.: Kundi (Surguja).
The twigs are used as tooth-brush (EBH 3529).
18. *C. tora* 'Charota' (Caesalpiniaceae) *Loc.*: Aeppu (Raigarh).
The seed powder (5-10 gm) mixed with tea is used two or three times daily in cough, headache and fever. The young leaves are cooked as vegetable (EBH 4725).
19. *Celastrus paniculatus* 'Malkangni' (Celastraceae).
Loc: Kundi (Surguja).
The seed oil is used in healing wounds (EBH 3540).
20. *Celosia argentea* 'Dhota' (Amaranthaceae).
Loc.: Kundi (Surguja).
The fresh root decoction (50 ml) is used for one week as an antidote in snake bite (EBH 3550).

21. *Chloroxylon swietenia* 'Bharhi' (Meliaceae).
Loc.: Mansukh (Surguja).
The leaf paste (50 gm) is used three times daily for one week in swelling in legs of animals (EBH 3575).
22. *Cissampelos pariera* 'Korya-padhin' (Menispermaceae).
Loc.: Basantpur (Surguja).
The plant paste is used three times daily in the treatment of blisters (EBH 3513).
23. *Cleome gynandra* 'Hulhul' (Cleomaceae).
Loc.: Raigarh. The seed decoction is used in fever and leaf decoction in headache (EBH 4729).
24. *Crotalaria alata* 'Gunghra' (Fabaceae).
Loc.: Gamharia (Raigarh).
The whole plant paste is rubbed on body for curing joints and muscular pains. The root decoction (50 ml) is used five times daily in scorpion stings and in snake bite (EBH 4763, 3407).
25. *C. prostrata.* 'Bilaibar' (Fabaceae).
Loc.: Basantpur (Surguja).
The twigs are made into pieces and used in 'Nabhi' treatment (EBH 3510).
26. *Croton roxburghii* 'Putri' (Euphorbiaceae).
Loc : Boro (Raigarh).
The root and stem bark paste (50 gm) is used 3 or 4 times daily in dysentery. The poultice is used in muscular pain (EBH 4755).
27. *Curculigo orchioides* 'Talmule, Hookakand' (Amaryllidaceae).
Loc.: Sisrangha (Raigarh).
The root paste is mixed with castor oil (*Ricinus communis* L.) and rubbed on head in lunacy. The root decoction (50 ml) is used three times daily for one week in stomach trouble and dysentery (EBH 4743, 3402).
28. *Curcuma angustifolia* 'Tikhur' (Zingiberaceae).
Loc.: Gamharia (Raigarh).
The root (50-100 gm) mixed with milk is used three times daily in weakness and rheumatism (EBH 4765).
29. *Cuscuta reflexa* 'Akasbel, Amarbel' (Cuscutaceae).
Loc.: Kanakpur (Surguja).
The vapour of boiled plants is used two or three times daily in body swellings and fever (EBH 4782).

30. *Cyathocline purpurea* 'Chotagunja' (Asteraceae).
Loc.: Gamharia (Raigarh), Kundi (Surguja).
The root decoction is used in toothache. The plant is also used as fish poison (EBH 3406, 3552).
31. *Cymbopogon martinii* 'Rosa' (Poaceae).
Loc.: Madhopur (Raigarh).
The oil is distilled from its grain (EBH 3468).
32. *Cyperus sp.* 'Chhotamotha' (Cyperaceae).
Loc.: Kundi (Surguja).
The whole plant juice (20 ml) is used four to five times daily in cuts of the tongue (EBH 3548).
33. *Dendrocalamus strictus* 'Bans' (Poaceae).
Loc.: Gamharia (Raigarh).
The young shoots are used as vegetable and for pickle. The culms are used for basketry, mats and thatching purposes (EBH 4785).
34. *Dendrophthoe falcata* 'Bandha' (Loranthaceae).
Loc.: Mansukh (Surguja).
The flower are boiled in water and used for regulating menstrual cycle (EBH 3583).
35. *Desmodium motorium* 'Jugni' (Fabaceae).
Loc.: Gamharia (Raigarh).
The leaves are used for hypnotising tribal women in the treatment of diseases (EBH 3426).
36. *D. triflorum* 'Ban' (Fabaceae).
Loc.: Basantpur (Surguja).
The plant decoction (30 ml) is used three times daily as wormicide (3506).
37. *Dillenia pentagyna* 'Hasuadatti' (Dilleniaceae).
Loc.: Gamharia (Raigarh).
The root decoction (30 ml) is used three times daily in body pain (EBH 3413).
38. *Dioscorea bulbifera* 'Ganthe' (Dioscoreaceae).
Loc.: Sisrangha (Raigarh).
The young tuberous roots are eaten during early part of the rainy season as a precaution against snake bite (EBH 4724).
39. *Diospyros melanoxylon* 'Tendu' (Ebenaceae).
Loc.: Kundi (Surguja).

The root tablets (30 gm) are used by Oraon tribe three or four times daily in syphilis. The fruits are also eaten (EBH 3537).

40. *Elephantopus scaber* 'Jarukla Chilbil' (Asteraceae).

Loc.: Surguja.

The plant powder (50 gm) is used by Oraon tribe in skin diseases. The root is chewed in toothache by Korwa tribe. The root powder (50 gm) along with the root of *Ruellia tuberosa* L., is used for making rice beer 'Ranu' (EBH 4736).

41. *Emblica officinalis* 'Amla' (Euphorbiaceae).

Loc.: Surguja, Raigarh.

The bark and fruit decoction (20-50 ml) mixed with the fruits of *Terminalia chebula* Retz. (10 gm) are used three times daily to check vomiting. The fruit powder and bark juice are used three times daily in stomach trouble. The fruits are also eaten (EBH 4772, 3517).

42. *Eulaliopsis binata* 'Kans' (Poaceae).

Loc.: Kanakpur (Surguja).

The leaf blade along with the leaf of *Phoenix acaulis* Buch.-Ham. ex Roxb., are used for making baskets and brooms (EBH 4787).

43. Flemingia chappar 'Galphule' (Fabaceae).

Loc.: Gamharia (Raigarh).

The leaf juice mixed with 7 drops of mustard oil and a little amount of 'jaggery' is used in eye pain (EBH 4770, 3439).

44. *F. congesta* var. *semialata* 'Mahadeokama' (Fabaceae).

Loc.: Gamharia (Raigarh).

The root decoction (50 ml) is administered orally three times daily in spermatorrhoea (EBH 3416).

45. *Gardenia turgida* 'Khadarghar' (Rubiaceae).

Loc.: Sisrangha (Raigarh).

The root powder (25-30 gm) mixed with milk and sugar is used three times daily in spermatorrhoea (EBH 4722).

46. *Glossocordia bosvallea* 'Bhuigajora' (Asteraceae).

Loc.: Dhokatoli (Raigarh).

The dry plant powder is used in skin diseases (EBH 3437).

47. *Grewia hirsuta* 'Gursakri' (Tiliaceae).

Loc.: Kundi (Surguja).

The root paste is used in wound healing by Oraon tribe. The ripe fruits are eaten (EBH 3566).

48. *G. pilosa* 'Gursakri' (Tiliaceae).
Lac.: Kanakpur (Surguja).
The ripe fruits are eaten (EBH 4784).

49. *Heteropogon contortus* 'Churantghas' (Poaceae).
Loc.: Gamharia (Raigarh).
The root decoction (20 ml) mixed with roots of *Zizyphus mauritiana* (20 gm) and *Tephrosia purpurea* (10 gm) are used three times daily in cholic pain (EBH 4759).

50. *Hibiscus sabdariffa* 'Lalthapa, Patwa' (Malvaceae).
Loc.: Gamharia (Raigarh).
The fruits are kept in water for whole night and the liquid is used in dysentery and diarrhoea. The leaves and flowers are used as vegetable. The seeds are roasted and eaten. The stem bark is used as fibre (EBH 3578, 4768).

51. *Holarrhena antidysenterica* 'Korya' (Apocynaceae).
Loc.: Kumar (Surguja).
The bark paste (50 gm) is used in body and muscular pain (EBH 3532).

52. *Ichnocarpus frutescens* 'Dodhia' (Apocynaceae).
Loc.: Kundi (Surguja).
The root decoction (50 ml) is used four times daily in fever (EBH 3563).

53. *Jatropha curcas* 'Mukhrandhe' (Euphorbiaceae).
Loc.: Aeppu (Raigarh).
The seed oil is used in muscular pain and body swellings. The young twigs are used as tooth-brush in gum diseases. The oil is extracted from the seeds (EBH 4756).

54. *Lablab purpureus* 'Sem' (Fabaceae).
Loc.: Surguja [Cultivated]
The pods are eaten as vegetable. The seed powder is used two times daily in scorpion stings (EBH 3522).

55. *Lagerstroemia parviflora* 'Sidha' (Lythraceae)
Loc.: Mansukh (Surguja).
The wood is used as firewood (EBH 3582).

56 *Lannea coromandelica* 'Ghighan, Moyen' (Anacardiaceae).
Loc.: Kanakpur (Surguja).
The bark juice is used on cuts and wounds. The gum is used in diarrhoea and dysentery (EBH 4780).

57. *Lantana camara* 'Jhurante' (Verbenaceae).
Loc.: Mansukh (Surguja).
The twigs are used as tooth-brush (EBH 3574).
58. *Leucas plukenetii* syn. *L. aspera* 'Gomba, Guma' (Lamiaceae).
Loc.: Surguja.
The whole plant decoction (10-20 ml) is used three times in jaundice. The decoction (20-40 ml) mixed with 'black pepper' is used in bronchitis (EBH 4774).
59. *Madhuca longifolia* var. *latifolia* 'Mahua' (Sapotaceae).
Loc.: Mansukh (Surguja).
The bark juice (50 ml) is administered orally three times daily for easy delivery. The oil known locally as 'dolly', 'dory' or 'tora' is extracted from the seeds (EBH 3576).
60. *Martynia annua* 'Gaimokhe' (Martyniaceae).
Loc.: Kundi (Surguja).
The oil is extracted from ripe fruits and seeds by distillation (EBH 3565).
61. *Moringa oleifera* 'Sahjan' (Moringaceae).
Loc.: Kanakpur (Surguja).
The leaf decoction (50 ml) is used in cough and cold. The fruit is eaten as vegetable in cough, cold and fever (EBH 4778).
62. *Phoenix acaulis* 'Chhindi, Khajoor' (Arecaceae).
Loc.: Kundi, Kanakpur (Surguja).
The plant paste (30 gm) is rubbed on nipple by tribal women for easy lactation. The leaves are used for making baskets, mats, brooms and for thatching purposes (EBH 4786, 3516).
63. *Pimpinella bracteata* 'Tiryo' (Apiaceae).
Loc.: Dauthatoli (Raigarh).
The root decoction (50 ml) is used two times daily for one week in dysentery and constipation (EBH 3454).
64. *Plectranthus mollis* 'Bhosare' (Lamiaceae).
Loc.: Boro (Raigarh).
The root juice (50 ml) is used two times daily in fever. The paste is used in headache (EBH 4750).
65. *Plumbago zeylanica* 'Chituar' (Plumbaginaceae).
Loc.: Surguja.

The root and leaf decoction (50 ml) is used twice daily in stomach trouble (EBH 3584).

66. *Pongamia pinnata* syn. *P. glabra* 'Karanj' (Fabaceae).
Loc.: Dharamjagarh (Raigarh).
The oil is extracted from the seeds and used in skin diseases. The seed powder is used three times daily in piles. The young pods are used as vegetable (EBH 4748, 3436).
67. *Prunus persica* 'Satalu' (Rosaceae).
Loc.: Kaputole (Raigarh) [Cultivated].
The fruits are eaten (EBH 3461).
68. *Pygmaeopremna herbacea* 'Bilopako' (Verbenaceae).
Loc.: Gamharia (Raigarh).
The leaf poultice mixed with mustard oil is used as poultice in urinary troubles (EBH 4764).
69. *Rhynchosia minima* 'Bankurthe' (Fabaceae).
Loc.: Gamharia (Raigarh).
The whole plant is boiled in water and the same is used for bath by the tribal women after delivery for body cure (EBH 3433).
70. *Ricinus communis* 'Rendi' (Euphorbiaceae).
Loc.: Kundi (Surguja).
The oil is used as coolant in case of sun stroke (EBH 3523).
71. *Rivea hypocrateriformis* 'Kudha' (Convolvulaceae).
Loc.: Boro (Raigarh).
The leaf paste is used in skin diseases (EBH 4741).
72. *Ruellia tuberosa* 'Ranughare' (Acanthaceae).
Loc.: Sisrangha (Raigarh).
The root powder is used as stimulant in making rice beer (EBH 4735).
73. *Scoparia dulcis* 'Cranghae, Bhuidhania' (Scrophulariaceae).
Loc.: Raigarh.
The whole plant is used in dysentery and in menstrual disorders in women. The leaves are used as vegetable (EBH 4742, 3449).
74. *Semecarpus anacardium* 'Bhilwan' (Anacardiaceae).
Loc.: Basantpur (Surguja).
The oil is extracted from seeds and used in headache. The fruits are eaten (EBH 3512).

75. *Sesbania bispinosa* 'Siris' (Fabaceae).
Loc.: Kundi (Surguja).
The stem bark yields a fibre (EBH 3567).

76. *Shorea robusta* 'Sal' (Dipterocarpaceae).
Loc.: Gamharia (Raigarh).
It is a multi-purpose species used by the tribe for making dye from stem batk, oil from seeds, food plates from leaves and as timber (EBH 4771).

77. *Sida acuta* 'Chippi, Bariari' (Malvaceae).
Loc. Basantpur (Surguja), Dharamjagarh (Raigarh).
The root decoction is used in venereal diseases and cholic pain. The leaf paste is mixed with 'jaggery' and used in body pain (EBH 3501, 4747).

78. *Smilax zeylanica* 'Ramdatoon', 'Sarmukhare' (Liliaceae).
Loc.: Sisrangha (Raigarh), Baikunthpur (Surguja).
The young twigs are used as tooth-brush. The root decoction is used in weakness and spermatorrhoea (EBH 4740, 3415).

79. *Solanum indicum* 'Kutni' (Solanaceae).
Loc.: Gamharia (Raigarh).
The fruit juice (30 ml) is used three times daily for five days in fever. The fruits are eaten (EBH 3409).

80. *Soymida febrifuga* 'Rohan' (Meliaceae).
Loc.: Gamharia (Raigarh).
The bark decoction (50 ml) is used three times daily in fever and cough (EBH 4746).

81. *Symplocas racemosa* 'Kondari' (Symplocaceae).
Loc.: Mahua (Raigarh).
Used as firewood (EBH 3460).

82. *Tephrosia purpurea* 'Darkurthe', 'Bankurthi' (Fabaceae).
Loc.: Gamharia (Raigarh).
The fresh root (50 gm) is mixed with roots of *Diospyros melanoxylon* and *Phoenix acaulis* in equal quantity (50 gm) and the resultant liquor is used in stomach pain. Sometimes, the roots of *Zizyphus mauritiana* and *Heteropogon contortus* are also mixed and used as above (EBH 3598, 4758).

83. *Terminalia alata* 'Saja' (Combretaceae).
Loc.: Boro (Raigarh).
The bark decoction (50 ml) is used two to three times daily in fever. The young leaves are used as fodder (EBH 4738).

84. *T. bellirica* 'Bahera' (Combretaceae).
Loc.: Dhokatoli (Raigarh).
The fruits are eaten. The oil is extracted from the seed kernel (EBH 4751).
85. *Thespesia lampas* 'Bankapas' (Malvaceae).
Loc.: Kanakpur (Surguja).
The dried roots and fruits are powdered, burnt and inhaled as smoke three times daily in bronchitis (EBH 4777).
86. *Themeda quadrivalvis* 'Rata' (Poaceae).
Loc.: Salba (Surguja).
Used as fodder (EBH 3588).
87. *Thysanolaena maxima* 'Dhore' (Poaceae).
Loc.: Gamharia (Raigarh).
The hollow culms are used for making pen The culms are also used for making brooms and 'Chiyari' (bow) (EBH 3408).
88. *Trichodesma indicum* 'Kaurla' (Boraginaceae).
Loc.: Dhauthatoli (Raigarh).
The fresh root paste is rubbed on body in the treatment of swellings (EBH 3451).
89. *Tridax procumbens* 'Titarphool' (Asteraceae).
Loc.: Dhauthatoli (Raigarh).
The leaf and root paste are used in headache. The leaf juice is also used in eye diseases (EBH 3447, 3508).
90. *Typha angustata* 'Bocho kand' (Typhaceae).
Loc.: Dhauthatoli (Raigarh).
The root decoction is used in the treatment of fever and in indigestion. It is also used for making mats, brooms and for thatching purposes (EBH 3438).
91. *Urena lobata* 'Latonga' (Malvaceae).
Loc.: Surguja.
The root decoction is used in magico-religious treatment of fever and in syphilis and urinary troubles (EBH 3599).
92. *Uraria lagopodioides* 'Chalki' (Fabaceae).
Loc.: Gamharia (Raigarh).
The root decoction (50 ml) is used three times daily for one week in stomach troubles (EBH 3425).
93. *Urginea indica* 'Jangali piyaz' (Liliaceae).
Loc.: Kanakpur (Surguja).
The bulb paste mixed with oil of 'Mahua' (*Madhuca longifolia* var. *latifolia*) is used in treatment of ulcer (EBH 4778).

94. *Vanda tessellata* 'Banda' (Orchidaceae).
Loc.: Gamharia (Raigarh).
The leaf decoction is used in ear pain (EBH 4730).
95. *Vernonia anthelmintica* 'Kalajeera' (Asteraceae).
Loc.: Gamharia (Raigarh).
The seed decoction (50 ml) is used three times daily in fever (EBH 3592).
96. *Vicoa indica* 'Dantpiri' (Asteraceae).
Loc.: Mahua (Raigarh).
The whole plant is powdered and rubbed gently on gums in toothache (EBH 3459, 3419).
97. *Vigna vexillata* 'Urdikand' (Fabaceae).
Loc.: Dhokatoli (Raigarh).
The roots as well as pods are eaten (EBH 4753).
98. *Vitex negundo* 'Nirgudi' (Verbenaceae).
Loc.: Aeppu (Raigarh).
The leaf juice is mixed with the seeds of *Trachyspermum ammi* and is used in stomach trouble in cattle and in conjunctivitis. The root decoction (20-50 ml) is used three times daily in joint pains and spermatorrhoea (EBH 4726).
99. *Woodfordia fruticosa* 'Dhama' (Lythraceae).
Loc.: Raigarh.
The flowers are used for making dye.
100. *Zizyphyus xylopyrus* 'Chhotaber' (Rhamnaceae).
Loc.: Kundi (Surguja).
The fruits are used for making dye (EBH 3554).

Conclusion

These studies show that the tribals supplement their diet with roots, tubers, leaves, flowers, fruits and seeds of various plant species collected from the forests. These are consumed as well as preserved for future use. During the months of April, May and June the tribals depend almost entirely upon different kinds of fruits, seeds and tubers. A kind of bread is prepared from the powder of mango seed called 'taak'. 'Handia' (rice beer) is prepared in the region and is the favourite drink of the tribe. The oil extracted from the seeds of Mahua (*Madhuca longifolia* var. *latifolia*) called 'tora' and from seeds of Bahera (*Terminalia bellirica* is consumed by the tribals.

The total numbers of plant species of ethnobotanical importance are categorised below:

Tribal uses	*No. of species*
1. Edible plants	25
2. Ethnomedicinal plants	75
3. Material culture (cordage, basketry, mats, brooms, combs, pens, bow, food plates etc.)	10
4. Oil-yielding plants	10
5. Dye-yielding plants	4
6. Miscellaneous uses	15

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8

LESS KNOWN MEDICINAL USES OF PLANTS AMONG THE TRIBALS OF HAZARIBAGH DISTRICT OF BIHAR

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ABSTRACT

The authors un dertook ethnobotanical studies in Hazaribagh district of Bihar. This district was selected, as the tribals here were using a large number of wild plants for food, medicine, etc. The major tribes of the State, viz., Oraon, Birhor, Santhal, Munda and Khond inhabit the area. The present paper deals with fifty less known medicinal uses of plants which are not recorded in published literature. The mode of usage and the doses prescribed are given.

Introduction

Hazaribagh district in Bihar was selected for ethnobotanical studies as it is within the tribal belt of India. Out of the total population of over three million, the scheduled castes and scheduled tribes are over 10 per cent (Chari, 1975). The main tribes of this district are: Santhal, Munda, Bedia, Karmali, Oraon, Mahali, Birhor and Khond.

The district has a hilly terrain, thick forest occupy nearly 46 per cent of the total area.

During ethnobotanical field studies in different parts of Hazaribagh district, the authors came across a large number of tribal people who are using wild plants for food, medicine, insecticides, etc. The authors, therefore, became interested

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in finding out authentic tribal uses of these plants, giving emphasis on those which are not available in published literature (Bodding, 1927; Bressers, 1951). The present paper deals with medicinal uses of fifty such plants. The data have been collected either from tribal medicinemen who accompanied in the field or from old tribals who are experienced and are actually prescribing these materials to cure different diseases.

The methodology followed in this work is the same as that described by Jain (1965). The materials collected are in the Economic Botany Section of the Central Botanical Laboratory of the Survey, either in the form of herbarium sheets or museum specimens.

Botanical names of the plants are arranged alphabetically, followed by tribal names, locality of collection and tribal uses. All the plants were collected by the senior author (CRT). The numbers in large bracket indicate his collection numbers.

Abbreviations used in this article are as follows: B=Birhor; H=Hindi; K=Khond; loc.=Locality; O=Oraon; S=Santhal; M=Munda and K.M.=Kurmi Mahato.

Acacia catechu

Get-langhan (S)—loc. Lavalong (Chatra): Root made into a paste and applied on the joints for seven days for rheumatism [15238].

Adina cordifolia

Karam (B)—loc. Dhajadhari Pahar (Koderma): Bark made into a paste and given orally in scar formation of skin and when the body becomes yellow, once daily on an empty stomach for 15 days [18905].

Ailanthus excelsa

Ghar-karna (B)—loc. Chatarba (Jhumri Tilaiya): Bark made into a paste and mixed with water. It is given to a pregnant lady (two to three months pregnancy) for abortion, once daily for two days on empty stomach [18618].

Ampelocissus barbata

Chundura (B)—loc. Chatarba (Jhumri Tilaiya): Root made

into a paste with mustard oil. The mixture is heated and applied between the fingers or toes for curing eczema; it is applied for four to five days [18632].

Apluda mutica

Chofki basar (O)—loc. Kanahari hill (Hazaribagh town): Plant made into a paste and given for three to four days as a remedy for animals suffering from tongue or mouth sores [24060].

Asparagus racemosus

Sataor (B)—loc. Chatarba (Jhumri Tilaiya): Root-juice dropped in the mouth or nose to stop bleeding, once daily till bleeding stops [18605].

Atylosia scarabaeoides

Bon-Kurthi (B)—loc. Chatarba (Jhumri Tilaiya): Plant or root made into a paste and mixed with coconut oil. This is applied on the head for 15 days to check falling hairs or to cure baldness [18606].

Bridelia retusa

Khaja (H)—loc. Chatarba (Jhumri Tilaiya): Bark made into a paste and kept overnight in a glass of water. Next morning, and for three consecutive days, the decoction given to a lady during menstruation to ensure fertility [18667].

Cassia tora

Chakar (O); *Chakunda* (K)—loc. Singhani (Hazaribagh town): Root made into a paste and along with the powder prepared from the horn of a cow, given orally once daily in high fever, and to a patient who is unable to speak and hear [24080].

Cissampelos pareira

Nanki-Jari (O)—loc. Khorar (Barhi): Root made into a paste given for fever once daily on empty stomach for five days [18505].

Cleome viscosa

Barhur (O)—loc. Chorpahar (Barhi): Five drops of fruit

juice dropped in each ear once daily for three days to cure intermittent fever [18516].

Crotalaria bialata

Murgijori (K.M.)—loc. Hazaribagh National Park: Root made into a paste and given three times daily for nine days in discharge of blood with urine [24006].

Crotalaria spectabilis

Jhun Jhunia (O); *Sonokai* (K)—loc. Kanahari Hill (Hazaribagh Town): Plant made into a paste and applied in rheumatism twice daily for 15 days. The patient should take it on empty stomach one hour before his meal.

Another method of tribal use is that the fresh plant is swept over the body of a patient three times daily for 15 days [24061].

Croton roxburghii

Mason, Putri (O); *Putri* (B); *Kuti* (K)—loc. Singhani (Hazaribagh town) and Jhumri Tilaiya: Juice extracted from fresh young twigs dropped in the eyes to cure blindness and also to remove cataract; one to two drops put in each eye once daily in the evening for three days.

Young stem juice applied on ringworm for seven days [24081, 18614].

Curculigo orchioides

Tarmul (B)—loc. Dhajadhari Pahar (Koderma): Root made into a paste with *Carum carvi* and tablets prepared out of it. These tablets are kept overnight in water and the decanted water is prescribed for seven days in white discharge with urine and in leukorrhoea.

A small bunch of roots made into a paste with *Cynodon dactylon* and given in epilepsy for seven days [18901].

Cuscuta reflexa

Ambar bail (M)—loc. Chaur Nursery (Chatra): Plant made into a paste and applied with bandage for curing *Eksira* once daily for seven days [15166].

Cyperus iria

Agarmotha (S)—loc. Huntergung (Chatra): Root made into a paste and dropped on joints twice daily for seven days to cure pain in rheumatism [15102].

Dendrophthoe falcata

Sakhua-ka-banda (S)—loc. Chaur Nursery (Chatra): This parasite on *Shorea robusta* is made into a paste and applied twice daily for seven days on the paralytic part of the body [15148].

Desmodium pulchellum

Etha-ka-jar (B)—loc. Dhajadhari Pahar (Koderma): Root made into a paste and mixed with sugar candy. This is prescribed to a patient suffering from burning sensation in the abdomen or chest once in the morning on an empty stomach and another dose in the evening [18927].

Flemingia chappar

Rusia Gach (S)—loc. Mardanpur (Chatra): One to two drops of juice extracted from pressed seeds put in the eyes as a remedy in eye troubles and to remove cataract [15151].

Globba bulbifera

Dama Khasi (B)—loc. Dhajadhari Pahar (Koderma): Ten grammes of root or 3 cm long and 10 gm of *Piper nigrum* made into a paste and tablets prepared out of it. The tablets prescribed for cough and asthma; one tablet given twice daily for 15 days, in early morning and at bed time [18919].

Gloriosa superba

Nagaser (B); *Jhagrai, Bajhi* (O)—loc. Chatarba (Jhumri Tilaiya): Root made into a paste with mustard oil and applied on the body for curing periodic fever. It should be continued for four days.

Leaf paste heated and applied on the forhead and neck for seven days for curing asthma of children [18628, 24074].

Glossogyne bidens

Bandhania (O); *Otabarangu* (K)—loc. Singhani (Hazaribagh

Town): Plant made into a paste which is prescribed in dysentery for three days on an empty stomach. This is also kept in the side of the teeth for extracting toothworm and for curing toothache.

The root with that of *Tridax procumbens* is mabe into a paste and used as a poultice on fractures for setting bones [24075].

Grewia subinaequalis

Kukur Ahwar (M)—loc. Chatra: A small piece of stem or root worn as an amulet on the waist for curing inflammation of the testicles [15215].

Habenaria crinifera

Bonsirso (B)—loc. Chatarba (Jhumri Tilaiya): Plant made into a paste and applied on the head or forehead twice daily for two days to cure headache [18661].

Hemidesmus indicus

Onarshing (K); *Kapurni* (O)—loc. Singhani (Hazaribagh Town): The root made into a paste with *Cynodon dactylon* and the paste again mixed with goat's milk and given once daily on an empty stomach for seven days to a lady after child birth, for lactation [24014].

Hibiscus rosa-sinensis

Urhul (S)—loc. Chatra: Flower bud made into a paste which is prescribed in impotency, once daily on an empty stomach for seven days [15263].

Leea crispa

Hasna (O)—loc. Patratu (Hazaribagh Town): The root with bark of *Boswellia serrata* made into a paste which is prescribed in case of snake bite, twice within an interval of one hour [24072].

Leonotis nepetaefolia

Karijari (S)—loc. Kanahari Hill (Hazaribagh Town): Ashes of the plant with fruit mixed with mustard oil and applied on

the body for curing paralysis, twice daily for 15 days or it can be continued for one month depending on the condition of the patient [15281].

Lepidagathis hamiltonia

Bhui Nim (S)—loc. Laskari (Chatra): Leaves of this plant with bulbs of *Allium cepa* made into a paste which is applied on the body for curing itching. An ointment prepared from the leaf paste, mixed with resin of *Shorea robusta* and oil of *Pongamia pinnata* applied on the body twice daily for seven days for curing sores [15196].

Leucas cephalotes

Goma (K)—loc. Hazaribagh National Park: A twig with flower and seeds made into a paste and mixed with mustard oil; two to three drops are put in the ear for curing pus formation in the ear [24049].

Lygodium flexuosum

Naganacha (K)—loc. Hazaribagh National Park: Root made into a paste which is given for regaining health, or to a person suffering from loss of appetite, once daily on empty stomach for three days [24016].

Madhuca longifolia

Soso (K); *Mahua* (O)—loc. Patratu (Hazaribagh Town): Mohua oil, mustard oil, karanja oil (from *Pongamia pinnata*) and cow's ghee mixed together, and is put in a water container and churned. The butter like substance that emerges is applied on the chest for seven days as remedy for pneumonia, cold and chest pain [24068].

Meyna laxiflora

Katai ara (M)—loc. Chaur Nursery (Chatra): Decoction of leaves prescribed in dysentery, once daily, early morning on an empty stomach till it is checked [15283].

Ochna obtusata

Chap (B)—loc. Chatarba (Jhumri Tilaiya): Root made into

a paste which is p escribed once daily on an empty stomach for three days in periodic fever [18608].

Polygala arvensis

Rali (B)—loc. Chatarba (Jhumri Tilaiya): Root with two and a half seeds of *Piper nigrum* made into a paste and mixed with cow's hot milk. This is prescribed in cough and asthma twice daily for seven days, once on an empty stomach and again in the evening [18609].

Pterospermum acerifolium

Makchand (S)—loc. Lavalong (Chatra): Flowers soaked overnight in water are pressed between the hand and mixed in the same water. The water after straining is mixed with sugar and given once daily on an empty stomach for three days as a remedy for indigestion, body dehydration and in passing of blood with urine [15242].

Rivea hypocrateriformis

Jamruchalum (K)—loc. Hazaribagh National Park: Leaves roasted with semi-powdered inflorescence of *Syzygium aromaticum* and cow's ghee. This is prescribed for concentration of semen, once daily on an empty stomach for three weeks [24015].

Scoparia dulcis

Jalan (B)—loc. Dhajadhari Pahar (Koderma): Paste made from leaves soaked overnight in water, given once daily for 15 days in burning sensation during urination [18946].

Sida acuta

Kamraj (B)—loc. Chatarba (Jhumri Tilaiya): Root made into a paste which is mixed with mustard oil and heated It is applied on the waist as a remedy for pain, for two to three days [18604].

Sida cordifolia

Sarakbuti (S)—loc. Huntergung (Chatra): Pulverised leaves and stem with sugar candy soaked overnight in a glass of water

Next morning they are pressed in between the palms and strained. The decoction thus prepared prescribed once daily on an empty stomach for seven days in gonorrhoea and for concentration of semen [15107].

Smilax zeylanica

Raipan (B); *Ram datan* (K.M.)—loc. Chatarba (Jhumri Tilaiya), Hazaribagh National Park: Stem used as a toothbrush in toothache, spongy gum and worn out teeth.

Root made into a paste and prescribed in anaemia once daily on an empty stomach for four days [24056].

Soymida febrifuga

Parair (M)—loc. Chaur Nursery (Chatra): Twigs of the plant given to cows to accelerate extrusion of placenta after delivery [15162].

Sphaeranthus indicus

Khardhani Gha: (M)—loc. Chaur Nursery (Chatra): Plant made into a paste with *Cynodon dactylon* and applied on the head twice daily for two days to remove headache [15143].

Terminalia alata

Karaka (K); *Aswan* (H)—loc. Singhani (Hazaribagh Town): Two to three leaves from a fresh twig made into a paste and given three times a day for one day in vomiting and loose motions [24079].

Ventilago calyculata

Sanarjom (B)—loc. Chatarba (Jhumri Tilaiya): Root made into a paste and heated with water, then allowed to cool. One to two drops put in the ear once daily for three days as a remedy in earache and flow of pus from the ear [18656].

Vitex negundo

Sinduar (O)—loc. Khorar (Guryakarma): Instead of using chemical insecticide, the tribal people sweep the paddy field with brooms made up of branches which are presumed to act as an insecticide. With this method the growth of paddy is also believed to become vigorous [18501].

Wattakaka volubilis

Bari (K); *Barka* (O)—loc. Singhani (Hazaribagh Town): Bark made into a paste, and mixed with hot milk. This is prescribed twice daily for two days in discharge of blood with urine and other urinary troubles [24083].

Xeromphis spinosa

Dudri (M); *Nisawala* (B)—loc. Dhajadhari Pahar (Koderma): Stem bark made into a paste, and mixed with goat's milk and country liquor. This is prescribed in rheumatism once daily on an empty stomach for 15 days [18625].

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9

NATIVE MEDICINAL USES OF PLANTS BY THE ASURS OF NETARHAT PLATEAU (BIHAR)

S.P. Gupta[1]

ABSTRACT

The Asurs live and enjoy the life amidst nature in the pat areas of Netarhat plateau within Chotanagpur division of south Bihar, collecting tubers, roots, fruits, flowers, leaves, fibres, lac, honey and gums from the forest and using them in a variety of ways. This paper deals with certain mythological notions about diseases and their cure and natural remedies, decoctions and lotions of herbs which come from the neighbouring forests. Many of these uses are not known outside their tribal community.

The native uses of medicinal plants by the Asurs are discussed here under ten categories, viz., (1) Fever, body pains and headache, (2) Langhan (rheumatism, gout and paralysis), (3) Cough and asthma, (4) Cholera, diarrhoea and dysentery, (5) Urinary complaints, (6) Skin diseases, (7) Burns, cuts and wounds, (8) Snakebites and poisoning, (9) Weakness, and (10) Miscellaneous diseases.

Introduction

Chotanagpur, within the State of Bihar is considered to be the centre of the tribal belt in the heart of India but the thirty scheduled tribes here constitute only 39.9 per cent of the total population, and the Asur who numbered 7,026 in 1971 constitute only 0.14 per cent of the total tribal population (Das 1972).

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Though the area is considered by many as a land of dense forests, today forests cover only 32.2 per cent of its area.

The Asur region, namely the Netarhat Plateau abounds in herbs, and the Asur, traditionally, a minor iron smelting tribe, have been using some of the medicinal herbs in the treatment of their various diseases. But their usage is not so far recorded in literature. It is important that before this oral folklore about plants and other natural resources is lost by modernisation and industrialisation, it should be recorded.

Native concept of health, disease and remedy

The native concept of health, disease, treatment, and of life and death is as unique as their culture. The usual theory of disease in tribal society is that disease is caused by the breach of some taboo or by hostile spirits, the ghosts or the dead. Sickness is the routine punishment for every lapse and crime meted out to them by these spirits. As a matter of fact, disease to a tribal mind is like another phenomenon of the natural world, is many-faceted and essentially incomprehensible in the sense that no single theory will perfectly cover all the known facts.

Disease and divination

The Asurs generally lead a healthy life, though some of them do occasionally suffer from diseases like malaria, skin diseases, bowel complaints, influenza, ophthalmia, goitre, etc. Influenza is called *Hava Duk* meaning air affliction. Eye diseases are very frequent. Night blindness among the Asur is reported to be assuming serious proportions. Occurrence of 11.3 per cent colour blindness among the Asurs is rather high and such frequency has not been reported among other Indian tribes. Bad drinking water may be responsible for the prevalence of goitre as well as bowel complaints. Among the epidemics, the Asur recognise four, namely, cholera, small pox, measles and chicken pox. Children's disease locally called *Rangbad* has now become very common in this area. It is said that this disease was imported from the tea gardens in Assam and Bhutan. The mortality rate due to *Rangbad* is stated to be almost hundred per cent.

The Asurs believe that *Dakia* or *Bishaha* (spirits) exercise evil influences. So they use several kinds of amulets commonly worn in a string round the neck, the waist or on the elbow. The most frequently used form is a small hollow receptacle with medicine inside it. Another is a dysentery stone which is believed to be a charm against the disease A third is a piece of root or bark tied on the body, its position depending on the nature of ailment. In female barrenness, the stuff used is the dried umblical cord On the whole, science and superstition are strangely blended together among the Asurs The medicineman gives the medicines, while the diviner called *Baiga* in addition to giving the medicines, tries to ascertain through divination whether the disease was caused by an evil spirit or a witch or a wizard.

Knowledge of medicinal plants

Although the tribal people attribute most of the ills of life to spirits and often seek the aid of magical practices and religious rites or sacrifices to get rid of such ills, they do not disregard the curative properties of fruits, flowers, barks, leaves and roots of plants and other natural products In fact the use of medicinal plants in the treatment of diseases was conceived by the tribals thousands of years ago. Even the Rgveda speaks of sages escorting the wandering Aryan tribes with a bagful of healing herbs.

The Asur indigenous system of medicine

Practically nothing is known regarding the origin of the large number of native medicines. They might have accidentally hit upon some herb and found it efficacious, or learnt by trial and experience.

For this study, the Asur customary medicinemen of Banspahar, Sakhua pani, Navatoli (Kujam) of Netarhat plateau, Bishunpur Block, Ranchi District in Bihar State were consulted. Bulk of Asur pharmacology is indigenous. There are many natural remedies, decoctions of herbs of healing lotions, ingredients of which mostly come from the forests of Netarhat plateau.

To the Asur, all fevers are alike and they hardly make any difference between simple fever, malaria, pneumonia, typhoid,

influenza, etc Similarly, they treat all stomach pains as same, whether it is dysenteric pains or constipation or some other intestinal disorder. So far as diagnosis of the disease is concerned, they face difficulty, particularly when confronted with any thing different from the diseases of everyday occurrence. Most of the diseases are symptomatic and the name is generally taken from some striking easily recognisable symptom. At times, the same disease may be known by several names.

For the sake of convenience the various ailments and their different remedies have been discussed under the following categories:

(1) Fever, body pains and headache
(2) Langhan (rheumatism, gout and paralysis)
(3) Cough and asthma
(4) Cholera, diarrhoea and dysentery
(5) Urinary complaints
(6) Skin diseases
(7) Burns, cuts and wounds
(8) Snakebites and poisoning
(9) Weakness
(10) Miscellaneous:

(a) Dental complaints, (b) Eye complaints, (c) Ear complaints, (d) Child birth, (e) Anaemia, (f) Jaundice, (g) Dropsy, (h) Consumption and (i) Abortion.

The botanical identity of plants is indicated in the Appendix.

(1) Fever, body pains and headache

Chitwar: In ordinary fever, the root is ground with water and the decoction is administered orally For curing stomach pain, the root is boiled in one litre of water till its volume is reduced to half. Then the root is crushed in it and the decoction is given orally. It is also said to promote digestion and appetite.

Sotawar: In fever due to heat, the root of *Satawar* and the root of *Putri* are ground with water and the decoction is orally administerd. The Birhors use it in Uraemia (blood in urine).

Parhi: In malarial fever, the root is ground with water and the decoction is orally administered.

In body, muscular or stomach pain, the root is ground with water and paste is prepared which is applied on the paining

parts. In addition, the decoction is also orally administered.

Charaogora. The bark decoction is used against fever. According to Bressers (1951), Col. Vomghan used it with success in Ranchi Hospital for malaria and black water fever.

Dudhia. For body pain, fever and blood dysentery, the root is powdered and taken with water. It is useful for removing worms in children and for bowel complaints.

The latex of the herb promotes formation and flow of milk in women.

Ghorbach. In children's fever, the root is ground with water and a lotion is prepared which is massaged over the body from the upper extremities to the lower, and not in the reverse.

In body pain and headache, the entire herb is crushed and rubbed on the aching parts at bed time daily till the pain disappears.

According to Jain (1979) the dried rhizome of the herb constitutes the drug Calamus. Due to presence of a volatile oil, Calamus acts as a carminative, i.e., it relieves flatulence and feeling of overfulness of stomach. It is considered a household remedy for colic and for increasing appetite. Due to its essential oil contents, it acts as an expectorant, i.e., it promotes flow of bronchial secretions and is useful for asthma. It also contains tannins and is therefore useful in diarrhoea and dysentery. It also acts as an emetic and larger doses can cause violent vomiting. Its powdered roots are used as vermifuge. The oil from the rhizomes is a good nerve stimulant and shows marked sedative and analgesic (pain relieving) properties.

The antibacterial and insecticidal activity of the rhizomes has been shown experimentally.

This plant has been cultivated in Mysore and other places and can be profitably grown in the tribal region of Chotanagpur.

Kalmeg. All parts of the plant above the ground are employed in preparing the medicinal decoction which is very bitter and given for fever, worms, dysentery and gastritis. Recent experiments have shown that the plant has antityphoid and antibiotic activity.

Sonpatti, Chechrilatanga and *Baghrandi.* Young seedlings of *Baghrandi,* root of *Chechrilatanga* and bark of *Sonpatti* are ground with water and the decoction is given for body pain.

An oil extracted from the seeds of *Baghrandi* is used as a laxative (dose: 15 drops).

Somraj. The seeds are used as a febrifuge and the leaves as vomitive. It is a valuable medicine as anthelmintic.

According to Jain its utility in thread-worm infections has been confirmed in trials in hospitals.

(2) Langhan (rheumatism, gout and paralysis)

The disease *Langhan* includes rheumatism, gout and paralysis. The symptoms for this disease, as described by the Asur, include occasional pain and swelling on the joints, the severity of pain being maximum on full moon and new moon days.

Some of the herbs used for the treatment of *Langhan* are:

Koraiya. A paste is prepared by grinding the root and bark with water which is massaged downwards on the affected or swollen part.

Kachchamba or *Kokorpotaba*. The paste is prepared by grinding the root with water which is massaged downwards over the affected part once at bedtime; it cures within nine days.

Kusum. The bark is powdered, and mixed with water, and boiled in an earthen pot. The decoction thus obtained is massaged lukewarm on the affected part thrice daily, it cures in four days.

Ratangora and *Chota Parhi*. The roots of both are ground with water and this paste is applied on the affected part and massaged from upper extremities to lower extremities. It cures within 8 to 10 days

Ghekwar, Banabe, Charagora. The roots of all the three are ground with water and this paste is massaged from upper extremities to the lower extremities three to four times daily. *Langhan* is cured within 9-10 days.

(3) Cough and asthma

Chandwa. Chewing of the root of this herb is said to cure cough.

Dhawai. A paste of the flowers is given for two or three days to cure cough. Both flowers and leaves yield a large percentage of tannin. The red flowers yield a dye which is yellow or pink.

Kharkhasa, Harsingar. The inflorescence and young fruits of *Kharkhasa* are pounded in water and given in cough, bronchitis and influenza.

It is a very common small tree and is well-known for its medicinal uses.

Rangaini The Mundas use the rind of the fruit for cough and the Oraons give the fruit and flowers mixed with ghee for the same purpose.

According to Jain the herb is used for cough, sore throat, bronchitis, asthma, pain in the chest, muscular pains, fever, etc.

(4) Cholera, diarrhoea and dysentery

Banaber. In bacillary dysentery and diarrhoea the bark which contains much tannin, is ground with water and the decoction is orally administered.

About 100 gms of root-juice of *Banaber* mixed with same quantity of root-juice of *Bariari*, filtered and this mixture is administered orally in stomach pain.

Gursukri, Kukurbicha. The fruit and decoction of leaves of *Gursukri* are used in diarrhoea and dysentery.

Karinari. The bark is ground with water and the decoction is orally administered to cure cholera.

Koraiya. The seeds are borne in long fruits called *Inderjao* and are used for preparing a decoction which is used in dysentery, diarrhoea and intestinal worms.

Ranpawan. The root is ground in water and the decoction is used in constipation, blood dysentery and renal trouble. It is also used as an appetiser.

Sakhua, Sal. The fruits (*Luku*) of *Sakhua* are pounded and their paste is reported to be given in loose motions. Its gum is powdered, mixed with fresh curd (*dahi*) and used for curing diarrhoea.

It is a very common tree in the forests of Chotanagpur plateau and large quantities of fruit and gum are available in the wild.

(5) Urinary complaints

Chhotidudhi (Indian Sarsaparilla). The root decoction of *Dudhi* is used in urinary complaints. The diuretic action of the

drug has been shown experimentally.

It is also largely used as a blood purifier.

Semri, Sembar. The bark and roots of this tree are pounded with water and sugar and filtered the mixture so obtained is given to promote urination

Mowna. The roots are pounded in water and the decoction so obtained is given with some sugar thrice daily for gonorrhoea.

(6) Skin diseases

Brihmi. For curing leprosy (called *Marang Rog* the great disease) the entire plant is boiled in water and the decoction so obtained is given to the patient.

According to Jain, the plant grows in moist places throughout India and contains asiaticoside which is considered responsible for its use in leprosy. Experiments on animals have confirmed its property of inducing fast growth of skin, hairs and nails.

Asan. The bark is burnt and mixed with *Til* oil, and is used for curing itch.

Karamij, Kanoud. The oil is extracted from the seeds of *Kanoud* and is used as a remedy for itch.

Kusum. The bark is astringent and rubbed with oil, the natives use it as a remedy for itch.

Manertige. The oil from its seeds is applied on eczema.

(7) Burns, cuts and wounds

Baghrandi. Latex mixed with salt is used on burns.

Bariari. The fruit and leaves of this creeper, which bears yellow flowers, are used as a poultice to cure boils.

Chitwar. The root is boiled in mustard oil till it begins to char. It is then filtered and the filtrate is applied on septic wounds.

Datrom singi. The bulbs are crushed with turmeric and the paste is applied on fractured bones.

The Mundas use the root and the bark against piles.

Harjarwa. In case of bone fractures, the fresh twigs of *Harjarwa* and *Thoungi* are chewed for five days; the fracture rejoins.

According to Cambell (Haines, 1925) the root is powdered and heated and applied on cuts and fractures. In case of a major fracture, the root of *Bora sak* is ground into paste and tied on the fracture for a month.

Mara chundi. The root is crushd and juice squeezed out and applied on any swollen part. As the lotion dries, it reduces the pain and the swelling subsides.

The pounded roots are also applied on wounds of cattle.

Salai. Antiseptic lotion is prepared from its bark. Its action seems to be like that of Dettol.

Sinduar. The stem of this shrub is pounded and applied externally with splinters as a cure for broken bones.

Siar punchi. For the healing of septic wound, the decoction is prepared by grinding the root with water and given internally.

According to Jain, the main use of the drug is in hart diseases. It forces more blood into the coronaries and improves the nutrition of the heart.

(8) Snakebites and poisoning

Bhonsri. In snakebite, the root is ground with water and the decoction is orally administered. The lotion is also massaged over the bitten part.

Dabial, Jai Jamni. The roots of creeper are supposed to be a good antidote for snakebite.

Gusumpuru. For cases of snakebite, the whole plant is dried, powdered and used. One teaspoonful of the powder is mixed in a glass of water and drunk, the same amount is applied on the bitten portion. Fr. Lakra of Dumarpat was reported to be using *Gusumpuru* for snakebites with success.

Koraiya. The person bitten by a snake is made to chew the crushed bark and it cures within three minutes. For cases of poisoning, eight days will be required for a complete cure.

According to Jain, the alkaloid conescine present in the bark has been found to retard growth of tubercular bacilli.

Piyar. The young bark together with new soil (preferably out of an ant-hill) is ground with water and a paste prepared which is massaged downwards on the snake-bitten part.

(9) Weakness

Burhi kumba. The root is powdered and a small quantity

of powder is taken with milk for sexual weakness.

Gursukri, Kukurbicha. Three pieces of the roots of *Gursukri* and *Kharharbanda* are ground with water and the decoction is orally taken in cases of sterility. The treatment is said to be more effective if administered on Sunday or Tuesday.

Ghodatulsi. Leaves are pounded and made into small pills; three pills a day are given for curing sexual weakness.

Kaj, Kajli. The gum is ground and mixed with water and given in cases of weakness

Mendi. The seeds used as medicine for weekness.

The leaves yield the well-known red dye Henna.

(10) Miscellaneous diseases

(a) Dental Complaints

Baghrandi. Latex is used for fixing loose teeth.

Chinya. Chewing of this root kills tooth infection.

Rangaini. The root is powdered and applied to an aching tooth (*Data hasua*).

(b) Eye Complaints

Galphuli. The juice extracted from leaves is mixed with salt and used as eyedrops.

Putri. Fresh oozing juice is applied in sore eyes.

Raipan. If people suffering from night blindness eat rice on the leaves of this plant for three successive days the disease is cured.

Sim. The juice of *Sim* leaf and dry tobacco mixed together is used for curing cases of ophthalmia.

(c) Ear complaints

Asan, Sain. The bark is powdered and taken with warm water; the powder is also mixed with mustard oil and applied in the ear in cases of impaired hearing.

Satgithia. The leaves are squeezed and the juice so obtained is mixed with salt and used as eardrops.

(d) Childbirth

Bichimandar or *Ghodatulsi.* The decoction is given to women after childbirth.

Chirchita. The roots of the shrub are pounded and boiled in water, and the extract is administered to a women after childbirth

Harjarwa. The stem and leaves of this creeper are pounded with water and given internally to a woman after childbirth, to remove pain.

Gulainchi. When mothers have no milk after childbirth, the leaves are crushed, mixed with *Karanj* oil and applied on the breasts

(e) Anaemia

Simal The leaves are boiled and given with sugar in case of anaemia.

Siris. The bark, leaves and fruits are boiled together, and the infusion is given in cases of anaemia.

(f) Jaundice

Asog. The leaves are boiled and the infusion is taken medicinally for curing jaundice.

(g) Dropsy

Rakatphar. The root is ground fine and applied as a thick plaster to reduce the swelling.

Sinduar, Gandiar. The leaves of *Sinduar* are applied on the body for curing dropsy.

(h) Consumption

Bahuar. The fruits are boiled in water and the infusion mixed with honey, is given in cases of consumption.

(i) Abortion

Kujuri, Molkangni. The decoction of bark is used as an abortifacient

The seeds are bitter and used as laxative, for curing leprosy, various fevers. paralysis, etc. (Anonymous, 1958).

Considerable amount of information on the traditional uses of plants is available with the tribals. It is, however, feared that with their progressive exposure to modernisation, this great treasure may be lost in due course. Therefore, there is an urgent need for botanists and anthropologists to collect all information

regarding plants used by tribals as food, medicine, fibre and for aesthetic purposes with particular reference to those used in family planning and to counter ageing.

The World Health Organisation (WHO) now recognises that traditional herbs do have healing properties and is making a study of plants used in traditional medicine. The traditional healers who prescribe these herbal medicines never studied conventional medicine. Their skills have been handed down to them by their predecessors

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Appendix

As voucher specimens are not available, botanical identity can be suggested only provisionally for most of the plants referred above. The following is an alphabetically arranged list of local names with probable botanical identity.

Asan	*Terminalia* sp.
Baghrandi	*Jatropa curcas*
Bahuar	*Cordia* sp.
Banaber	*Zizyphus* sp.
Bariari	*Sida acuta*
Bhonsri	*Anisomeles* sp.
Bichimandar	*Scoparia dulcis*
Brihmi	*Centella asiatica*
Chandwa	*Iphigenia indica*
Charagora	*Vitex peduncularis*
Chechrilatanga	*Achyranthes aspera*
Chhotidudhi	*Hemidesmus indicus*
Chirchita	*Achyranthes aspera*
Chitwar	*Plumbago zeylanica*
Datromsingi	*Cissus* sp.
Dhawai	*Woodfordia fruticosa*
Dudhia	*Euphorbia* sp.
Galphuli	*Moghania* sp.
Gandiar	*Pogostemon* sp.
Ghekwar	*Aloe* sp.
Ghodatulsi	*Scoparia dulcis*
Ghorbach	*Acorus calamus*
Gulainchi	*Plumeria rubra*
Gursukri	*Gewia* sp.
Gusumpuru	*Andrographis* sp.
Harjarwa	*Cissus quadrangularis*
Harsingar	*Nyctanthes arbortristis*
Kachchamba	*Boehmeria repens*
Kaj	*Bridelia* sp.
Kajli	*Bridelia* sp.
Kalmegh	*Andrographis paniculata*
Kanoud	*Carissa carandas*
Karamij	*Carissa carandas*
Karinari	*Erycibe paniculata*

Kharharbanda	*Gardenia* sp.
Kharkhasa	*Nyctanthes arbortristis*
Kokorpotaba	*Boehmeria repens*
Koraiya	*Holarrhena antidysenterica*
Kujuri	*Celastrus paniculatus*
Kukurbicha	*Grewia* sp.
Kusum	*Schleichera oleosa*
Malkangni	*Celastrus paniculatus*
Manertige	*Combretum decandrum*
Marachundi	*Elephantopus scaber*
Mendi	*Lawsonia inermis*
Mowna	*Randia* sp.
Parhi	*Pueraria tuberosa*
Piyar	*Buchanania lanzan*
Putri	*Croton* sp.
Raipan	*Smilax* sp.
Rakatphar	*Ardisia* sp.
Rangaini	*Solanum surattense*
Ranpawan	*Smilax* sp.
Sain	*Terminalia* sp.
Sakhua	*Shorea robusta*
Sal	*Shorea robusta*
Salai	*Boswellia serrata*
Satawar	*Asparagus racemosus*
Satgithia	*Spermacoce* sp.
Sembar	*Bombax ceiba*
Semri	*Bombax ceiba*
Siarpunchi	*Digitalis* sp.
Simal	*Bombax ceiba*
Sinduar	*Vitex negundo*
	Pogostemon sp.
Siris	*Albizzia* sp.
Somraj	*Centratherum anthelminticum*
Sonpatti	*Oroxylum indicum*
Til	*Sesamum indicum*

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10

HERBAL REMEDIES AMONG 'HO' TRIBE IN BIHAR[1]

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ABSTRACT

The use of 32 plants (in 25 folk-lore claims) employed for curing 17 diseases (and one as tonic) among the 'Ho' tribe of Bihar is reported. Information provided here is hitherto unrecorded or new.

Introduction

Pal and Srivastava (1976) while reporting their observations on the ethnobotany of the 'Ho' tribe of Singhbhum district mentioned 13 out of their total collection of 25 species as medicinal. Chander and Pandey (1984) who also worked in the same area recorded tribal uses of 49 medicinal plants without mentioning the name of the tribe who used these. The localities surveyed by these authors were Kumdi, Ponga, Trilposhi and Karampada.

In the present communication, for the first time, medicinal uses of 32 plants (in 25 folk-lore claims) used by the 'Ho' tribe living in Kumdi, Baraiburu, Kotgarh, Salai, Jate and Thalkobad are reported.

'Ho' tribe is the third largest tribe of Bihar. This tribe is mainly distributed in Kolhan and Singhbhum. Actually, they belong to Munda family who originally inhabited north-western India. 'Ho' in 'Ho' dialect means a man. The 'Hos'

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2, 3, *4. Central Institute of Medicinal and Aromatic Plants, Lucknow-226016.*

are chiefly agriculturists. However, they do not depend solely on agriculture. They supplement their food from forests, which supply them roots, fruits, flowers, leaves and yams. They also work in mines, factories and forests as seasonal labourers. The 'Ho' tribe speaks 'Ho' dialect of Munda language which belongs to 'Austro-Asiatic' group of languages (Prasad, 1961).

The field data obtained are compared with the literature on medicinal plants of tribal belt of Bihar in particular and those of India in general (Kirtikar and Basu, 1935; Jain, 1968; Anonymous, 1948-1972, 1985; Chopra *et al.*, 1969; Jain and Tarafder, 1970, Nayar and Chopra, 1956; Pal and Srivastava, 1976; Paul, 1977; Sharma and Sinha, 1980; Gupta, 1981; Tarafder and Chaudhuri, 1981; Jain, 1981; Chander and Pandey, 1984). Only those medicinal uses which seems new are reported here.

Materials and method

Two surveys were done in the area during April and November, 1986. The Bihar state forest department collaborated in the field work. The headmen (Mundas) and herbal practitioners (Vaids) belonging to the 'Ho' tribe were interviewed and information recorded. The folklore obtained from one village (including methods of administration of the drug) was cross checked with that obtained from another. Only new or unrecorded information obtained from reliable sources is reported here.

The specimens collected during these surveys were botanically identified and are deposited as vouchers in the herbarium of the Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow. When the plant part used was a well known commercial commodity, voucher specimens were not prepared.

Results and discussion

Of the 25 folk-lore claims recorded, 18 are administered in the form of single drugs in snake-bite, chest pain, dysentery, whooping cough, hydrophobia, ear-ache, stomach-ache, epilepsy, jaundice and applied externally in bone fracture, inflamation, rheumatism and as tonic after delivery. In 7 cases, compound preparations are used in leucorrhoea, blood purification, malaria, paralysis, snake-bite and to relieve pain during

delivery. Considering individual plant parts, roots are used in 18 cases, stem-bark in 8 and leaf, rhizome and whole plant in 2 each. In 20 cases, dried crude drugs are used, whereas in 5 fresh plants are procured. Of the total 32 plants involved, materials of 26 are collected/obtained by this tribe from the wild, 4 from cultivation and 2 from commercial source.

These folk-lore claims with their related data are presented further in a tabular form.

The following abbreviations are used: LF: Leaf; PL: Whole plant; RH: Rhizome; RT; Root; SB: Stem bark.

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TABLE

Sl. No.	Botanical name and family	Tribal name of plant	Part used	Mode of administration	Disease	Field Number	Locality
1	2	3	4	5	6	7	8
1	*Alstonia scholaris* (Apocynaceae) and	Chatinidaru	SB	Decoction with country liquor	Pain during delivery	1993	Kumdi
	Achyranthes aspera (Amaranthaceae)	Sitirikar	RT			4115	Kumdi
2	*Ardisia solanacea* (Myrsinaceae)	Gulanchi	SB	Decoction	Blood dysentery	4603	Kumdi
3	*Atylosia scarabaeoides* (Fabaceae)	Gulsuni	RT	Paste	Rheumatism	4358	Kotgarh
4	*Bridelia crenulata* (Euphorbiaceae)	Kaka	RT	Paste	Bone fracture	4430	Kotgarh
5	*Cassia fistula* (Fabaceae)	Hari	RT	Paste	Inflammation	4177	Salai
6	*Cassine glauca* (Celastraceae)	Lodh	SB	Decoction	Tonic after delivery	4365	Kotgarh
7	*Clausena excavata* (Rutaceae)	Ugani Jard	RT	Decoction	Dysentery	943	Baraiburu

1	2	3	4	5	6	7	8
8	*Ficus benghalensis* (Moraceae)	Bargad	RT	Decoction	Leucorrhoea	1972	Baraiburu
	and						
	Cynodon dactylon (Poaceae)	Dhoobghas	PL			4104	Baraiburu
9	*Flemingia chappar* (Fabaceae)	Gulphuli	PL	Decoction	Stomach-ache	4373	Baraiburu
10	*Lagerstroemia parviflora* (Lythraceae)	Seedha	SB	Powder	Snake-bite	1971	Baraiburu
	and						
	Gardenia gumifera (Rubiaceae)	Papadaru	SB			4145	Baraiburu
11	*Leea macrophylla* (Leeaceae)	Hathikan	RT	Powder	Hydrophobia	4330	Baraiburu
12	*Litsea glutinosa* (Lauraceae)	Gulchi	RT	Powder	Blood purification	4116	Thalkobad
	and						
	Pongamia pinnata (Fabaceae)	Karanj	RT			1976	Thalkobad
13	*Lygodium flexosum* (Schizaeaceae)	Sorgajal	RH	Decoction	Ear-ache	4395	Baraiburu

1	2	3	4	5	6	7	8
14	*Mallotus philippensis* Muell.-Arg. (Euphorbiaceae)	Rametha	SB	Paste	Chest pain	4361	Kotgarh
15	*Murraya paniculata* (Rutaceae)	Otheharsu	RT	Powder	Stomach-ache	4331	Baraiburu
16	*Nyctanthes arbor-tristis* (Nyctaginaceae)	Sapru	LF	Powder with honey	Whooping cough	4375	Kumdi
17	*Oroxylum indicum* (Bignoniaceae) with belladonna seeds and pepper [Gol mirch]	Sonapati	SB	Powder	Paralysis	4414	Kotgarh
18	*Pongammia pinnata* (Fabaceae) and	Karanj	SB	Powder	Leucorrhoea	1976	Baraiburu
	Lygodium flexuosum (Schizaeaceae)	Sorgajal	RH			4395	Baraiburu
19	*Rauvolfia serpentina* (Apocynaceae)	Nagbel	RT	Decoction	Rheumatism	4848	Jate
20	*Sida glutinosa* (Malvaceae)	Puri	LF	Paste	Inflammation	4312	Kumdi

1	2	3	4	5	6	7	8
21	*Thespesia lampas* (Malvaceae),	Veerkachham	RT	Powder	Malaria	4121	Kumdi
	Croton oblongifolius (Euphorbiaceae)	Putri	RT			4122	Kumdi
	and						
	Asparagus racemosus (Liliaceae)	Utro	RT			4120	Kumdi
22	*Uraria xylopyra* (Fabaceae)	Prasani	RT	Decoction	Rheumatism & snake-bite	4417	Kotgarh
23	*Vicoa indica* (Asteraceae)	Tiya Baha	RT	Powder	Epilepsy	1986	Kumdi
24	*Vitex peduncularis* (Verbenaceae)	Simjanga	RT	Powder	Jaundice	4333	Kumdi
25	*Ziziphus xylopyrus* (Rhamnaceae)	Kakra	RT	Paste	Rheumatism	4366	Jate

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11

ETHNOBOTANICAL STUDIES IN ORISSA

H.O. Saxena[1], *M. Brahmam*[2] *and P.K. Dutta*[3]

ABSTRACT

Ethnobotanical observations on 83 species recorded during the survey in Orissa are given. The species are arranged alphabetically, giving details of local name, local use, locality and field number. A comparison with important published literature on the medicinal and economic plants of the country shows that most of the uses reported here, are new.

Introduction

With the ideal combination of good forest cover, rich flora and large tribal population comprising as many as 60 different tribes, the state of Orissa is interesting for the study of ethnobotany. The authors having been engaged in the survey of medicinal and other economic plants in the State for several years, and have gathered interesting information on the tribal uses of a number of plants. An account of the ethnobotanical observations on 81 species, was published earlier (Saxena and Dutta, 1975).

The present article deals with the ethnobotanical observations on 83 species, recorded during the course of survey in the regions of Mayurbhanj, Cuttack, Puri, Dhenkanal, Sambalpur and Ganjam districts. The field work was done among the Kol (Simlipal), Saora (Ganjam), Kondh (Ganjam) and other tribes in the State. The species have been arranged in alphabetical order with deals of their local name, name of locality where

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notes were recorded, and local uses followed by the field number.

A number of interesting tribal uses for antifertility, medicine, food, etc. are described, most of which have been found to be new on comparison with the important published literature on the medicinal and economic plants of the country.

The botanical specimens collected at the time of recording the notes are preserved in the herbarium of the Regional Research Laboratory, Bhubneshwar.

The following abbreviations are used in the paper: Or: Oriya language; K: Language of Kols; S: Saora language; Kondh: Language of Kondhs; Tel: Telugu language; Loc.: Locality.

Enumeration

Aerva lanata

Loc. Paniganda, Ganjam: Leaves wrapped in a castor leaf, heated over fire and the juice obtained by crushing and pressing the leaves poured in the ear to relieve ache [3401].

Alysicarpus bupleurifolius

Akranti (Or)—loc. Paniganda, Ganjam: 10 gms of the entire plant mixed with nine other drugs, *Gambhari* (*Gmelina arborea*), *Belo* (*Aegle marmelos*), *Labiankuri*, *Latabenkuri*, *Gurkhura chakra*, *Bishwa-ankranti*, *Sonari* (*Cassia fistula*), *Krushnuparni* and *Salparni* (*Desmodium* sp.) powdered and administered twice daily with *Pipli* (*Piper longum*) for fever [1958].

Antidesma diandrum

Nunnunia (Or)—loc. Adava, Ganjam: Decoction of leaves (10 gms) given for bile complaints [2033].

Ardisia solanacea

Narsinghara (Or); *Bonkta* (S)—loc. Badarma, Sambalpur: Decoction of root (10 gms) and black peppers (10 in number) given to women for few days after delivery; it is considered to clean the internal system of the body. Tender shoots cooked as vegetable [3456].

Aristolochia indica

Panairi, *Panoviri* (Or); *Son* (S)—loc. Gazalbadi, Ganjam:

Root applied to wounds. Plant believed to keep snakes away [2860].

Loc. Bhubneshwar: Root (3 gm) made into paste and given twice daily for treatment of diarrhoea [930].

Atylosia volubilis

Bajhala (Or)—loc. Adava, Ganjam: Root paste applied on mumps [3236].

Azima tetracantha

Gandhmali (Kondh)—loc. Rambha, Ganjam: Seed-paste applied to cure redness and other ailments of eyes [3429].

Barringtonia acutangula

Hinjal (Or); *Tila* (S)—loc. Ganjam: Decoction of bark used as a mouthwash to relieve toothache and gum trouble [2401].

Bombax ceiba

Semal (Or)—loc. Nildungri, Sambalpur: Seed-paste applied to the body in case of small pox and chicken pox to provide quick relief [3457].

Borreria articularis

Solaganthi (Or)—loc. R. Udaigiri, Ganjam: Juice of leaves mixed with little salt poured in eyes in conjunctivitis and other eye diseases [3428].

Breynia retusa

Raktatrichuli (Or)—loc. Saptasajya, Dhenkanal: Application of bark-paste on inflammations provides immediate relief [3423].

Byttneria herbacea

Sambarkhai (Or)—loc. Ragada, Ganjam: Root-paste applied on swollen neck of cows [2940].

Canthium dicoccum

Kurma (Or); *Kanniya* (S)—loc. R. Udaigiri, Ganjam: Paste of root along with mustard seeds applied on boils [3427].

C. parviflorum

Brahmuniya (Kondh)—loc. Rambha, Ganjam: Paste of fruit applied on head in headache [2911].

Loc. Ragada, Ganjam: Paste of the root (8 gm) with three black peppers administered once daily for three days in swelling of the neck [3446].

Casearia elliptica

Majo (Or)—loc. Ramgiri, Ganjam: Bark of root mixed with dried squirrel rubbed on stone with water and the paste so obtained applied to enlarged scrotum in children [3408].

Cassia occidentalis

Kusundra (Or); *Kurtasakonda* (S)—loc. Pariganda, Ganjam: Root (5 gm) made into a paste along with 31 black peppers and given to nursing women for purification of the milk. Sugar candy water given for drinking [3402].

Celastrus paniculatus

Peng (Or)—loc. Nildungri, Sambalpur: Root (5 gm) made into paste with *Talmuli* (*Curculigo orchioides*), *Satavar* (*Asparagus racemosus*) and *Lilmutri* (*Smilax* sp.) filtered through cloth and given twice daily four to five days in *Dhat-rog* (Spermatorrhoea) [3450].

Centella asiatica

Thalkuri (Or); *Tharkuni* (Beng.)—loc. Bhitarkanika, Cuttack: Two to three spoonfuls of leaf-paste administered on an empty stomach for two to three days in dysentery [1645].

Chlorophytum arundinaceum

Bharatbatuli (Or)—loc. Surismuli, Ganjam: A decoction of the root (10 gm) and turmeric given twice daily for two days in 'Batrog' (Rheumatism) [2876].

Cissampelos pareira

Akanbindi (Or); *Tejomalla* (S)—loc. Ganjam: Root (5 gm) made into a paste with raw rice water and given twice daily for about a month to cure leprosy. Sour things are restricted in the diet.

Root crushed with equal quantity of ginger and made into pills of the size of a pea. One pill taken in the morning till piles are cured [1182].

Cleistanthus collinus

Karada (Or and S)—loc. Durgaprasad, Ganjam: Bark powdered and applied on wounds. Leaves put in a water tank for two to three days and the cows suffering from foot-sore are allowed to stand in this water for two hours daily for two to three days [3430].

Clerodendrum viscosum

Madhavi, Bena, Mahasindur, Kalamati (Or); *Kalamedi* (Kondh); *Beniya* (S)—loc. Badrama, Sambalpur: The paste of the root (8 gm) and rye given twice daily in case of blood dysentery (Ramgiri, Ganjam, 3407). The root-paste heated and applied to the chest to relieve pain [3455].

Loc. Durgaprasad Ganjam: Three to four leaves of the plant added to the fermenting *Mahua* liquor for quicker fermentation. Addition of the leaves is considered to reduce the total fermentation period to about half besides increasing the intoxicating effect of the liquor [3431].

Cocculus hirsutus

Dahdaya (Or); *Musakani* (Kondh)—loc. Saptasajya, Dhenkanal: Leaf paste applied on the head for cooling (Durgaprasad, Ganjam 3439).

In conditions of excess bile or mental disorder due to heat, the juice of the plant mixed with sesame oil aplied on the head and body. To allay stomach heat and for blood dysentery, the plant-paste applied over the navel region [3424].

Costus speciosus

Keo Gabkachya, Gaigobra (Or); *Bamkachika* (S); *Gaigaruda* (Kondh)—loc. Gadgal, Ganjam: The juice of the rhizome applied on head for cooling and to relieve headache [1210].

Loc. Surismali: The rhizome paste taken in and also applied to the head to allay body heat and burning sensation in the eyes [2899].

Loc. R. Udaigiri, Ganjam: The rhizome cooked and eaten and its paste applied to the head with castor oil to relieve giddiness [190].

Loc. Durgaprasad, Ganjam: The juice of the rhizome poured in the ear to relieve ache. The rhizome eaten with sugar to expel intestinal worms [3432].

Loc. Nildungri, Sambalpur: The rhizome used as a fish-poison [3459].

Crataeva nurvala

Barun (Or)—loc. Chilka Ganjam: Fruit eaten after roasting [2269].

Cressa cretica

Dahna (Or)—loc. Rambha, Ganjam: Plant cooked as vegetable [2499].

Croton roxburghii

Dev Chandan (Or)—loc. R. Udaigiri, Ganjam: Decoction of the bark (10 gm), rhizome of *Ramkedar* (*Zingiber montanum*), *prushupashan*, black pepper and *Nimba chhatu* (mushroom growing on a neem tree) given in cholera and diarrhoea [1897].

Cryptolepis buchananii

Gopkanu, *Gobkania*, *Khirkandi* (Or); *Madanaseku*, *Lavar* (S)—loc. Kapilas, Dhenkanal: Latex applied on cuts [3422].

Loc. R. Udaigiri, Ganjam: Paste of the root (5 gm) with milk and black pepper given to increase lactation [1403].

Curculigo orchioides

Talmuli (Or)—loc. Ragada, Ganjam: One full root made into paste with 10 seeds of gram and given once daily to stop nose bleeding [3442].

Cycas circinalis

Arguna (Or)—Durgaprasad, Ganjam: Tender leaves fried and taken as a vegetable [3433].

Cymbopogon flexuosus

Dhanantri (Or)—loc. Kapilas, Dhenkanal: Leaf paste given to cattle for gastric trouble such as flatulence [2070].

Cynometra sp.

Singra (Or)—loc. Bhitarkanika, Cuttak: Fruit roasted and eaten [1964].

Dillenia pentagyna

Karkat (Kondh); *Rai* (Or)—loc. Badarma, Sambalpur: Elephants relish the bark [3445].

Loc. Ragada, Ganjam: Paste of root and stem bark applied to rheumatic back [3443].

Drymaria quercifolia

Garuda Pakshini (Or)—loc. Ganjam: The rhizome-paste applied on the forehead to relieve headache. The rhizome tied somewhere inside the house to drive out evil spirits [3540].

Elephantopus scaber

Totachero (Kondh); *Mayurchulia, Amtuliya* (Or); *Pimpli* (S)—loc. Ramgiri, Ganjam: Paste of the root (3 gm) given and also applied locally for cure of pimples in infants [3409].

Loc. Sirismuli, Ganjam: Root made into paste with the aerial roots of *Ficus benghalensis*, root of white-seeded *Kainch* (*Abrus precatorius*). *Dubo* (*Cynodon dactylon*) and turmeric and applied to the body of the children suffering from *dubli* disease (debility followed by rapid deterioration of health). The treatment is started on Monday and continued for two days [3434].

Loc. Ragada, Ganjam: According to another method of use the root of single plant made into paste with turmeric and applied to limbs of children suffering from *dubli* disease. This is continued for seven days [3444].

Loc. Durgaprasad, Ganjam: In *paporog* (a disease having symptoms like epilepsy) the root and rice tied together in a cloth and kept near the nose [3435].

Loc. Nildungri, Sambalpur: Root paste applied on inflammations [3460].

Eleusine indica

Anamandia (Or)—loc. Ramgiri, Ganjam: Decoction of a single plant administered twice daily in fever [3410].

Garcinia xanthochymus

Rajambo (Or); *Lollarimanu* (S)—loc. Ganjam: Ripe fruit given in chronic constipation. The fruits are dried and stored for use throughout the year [3066].

Garuga pinnata

Handurmai, Kolimai (Or); *Garngudi* (S)—loc. R. Udaigiri: Bark (8 gm) and black peppers pounded and given twice daily for over 15 days in *meh* (diabetes). The powdered bark applied to wounds [3426].

Globba bulbifera

Krushnakedar (Or)—loc. R. Udaigiri, Ganjam: The paste of the root (5 gm) and rye given and also applied locally in snakebite [3425].

Gloriosa superba

Miriako, Miria Phulo (Kondh): *Dongogahana* (Or)—loc, Durgaprasad. Ganjam: Root-paste applied to the tongue in

Benga disease in cows (the tongue becoming thick and full of tubercles). Root also used as an abortifacient for which a single dose of the paste of 1 cm long root and three black peppers with milk is administered; this works in pregnancies of up to four months [3436].

Glycosmis mauritiana

Deonba, Chawaldhua, Pita Anchar (Or); *Jhati* (Kondh)—loc. Saptasajya, Dhenkanal: The fruit powder spread on a paper coated with butter which is then rolled and made into cigarettes. These cigarettes smoked to cure throat cancer. For cancer in other parts of the body, the fruit powder is applied. Root mixed with the roots of *Atundi* (*Combretum decandrum*) in equal proportion, powdered and applied on wounds and sores [2069].

Habenaria commelinifolia

Devsunda (Or)—loc. Adava, Ganjam: The entire plant (10 gm) pounded with *Ajowain* (*Trachyspermum ammi*); *Pipii* (*Piper longum*) and black pepper and the infusion given to check nose bleeding [2037].

Helicteres isora

Murmuri, Chirguri, Kukurbichia (Or); *Kurkurai* (S)—loc. Ganjam: The fruit is ground, soaked in hot water, filtered through cloth and the filtrate allowed to settle. Drops of decanted infusion are poured in the ear (one to two drops each time) twice daily to relieve ache. This is continued for three days after which only once a dat at bedtime for five days [2820].

Loc. Nildungri, Sambalpur: Fruit powdered and put in the ear to relieve ache [4361].

Hemidesmus indicus

Eriji (S), *Sugandhi* (Or)—loc. Adava, Ganjam: A decoction of the root (5 gm), *Talmuli (Curculigo orchioides), Elephantopus scaber* (root), *motha (Cyperus rotundus)* fennel and cumin given to children two to three times a day in diarrhoea [3403].

Holarrhena antidysenterica

Kerua (Or); *Pedankudu* (S)—loc. Buratal, Ganjam: Latex applied in case of eczema and other skin diseases [2486].

Holoptelea integrifolia

Dharanj (Or)—loc. Adava, Ganjam: Bark tied on the arm to cure hydrocele [3240].

Hygrophila auriculata

Koelekha (Or)—loc. Adava, Ganjam: A decoction of the root (10 gm), *Daskarada* (*Barleria cristata*), *Pitasukua* (dry fish) and goat urine administered twice daily in *swet vikar* (swelling on the face and entire body [3404].

Hymenodictyon excelsum

Ghuli (Or); *Buriga* (S)—loc. Nildungri, Sambalpur: Root paste used as an application on the joints in case of gout [2345].

Ipomoea maxima

Mindhi (Or)—loc. Ragada, Ganjam: Root (10 gm) made into a paste and given with sugar candy twice daily for two to three days in *meh* (diabetes) [3154].

Ixora arborea

Patra Koria, Kilakerua (Or)—loc. Bhitarkanika, Cuttack: Wood oil applied in case of eczema and other skin diseases. For extracting the 'oil', the wood is chopped into small pieces, air dried and filled in an earthen pot having a hole at the bottom. Another pot is kept below and fire is applied from all sides. The 'oil' is collected in the lower pot after sometime [1661].

Kalanchoe pinnata

Amarpui (Or)—loc. Bhitarkanika, Cuttack: Leaf paste given to allay body heat [1674]

Lagerstroemia parviflora

Sidha (Or) *Siddem* (S)—loc. R. Udaigiri, Ganjam: The bark dried, powdered, mixed in coconut or sesame oil and applied on wounds. On smaller wounds, leaf paste is applied [1262].

Leucas aspera

Gayas (Or)—loc. Adava, Ganjam: The leaf paste fried and applied on the forehead to relieve pain [3406].

Lippia javanica

Nagdabana, Bhutoni (Or)—loc. Dhabaleswar, Cuttak: The

plant paste applied to join fractured bones. The juice of the plant poured in the nose to get rid of evil spirits [3451].

Ludwigia octovalvis

Bhuikura (Or)—loc. Buratal, Ganjam: The plant paste with turmeric applied in case of eczema and other skin diseases for one week [2485].

Lygodium flexuosum

Mahajal (Or and Kondh)—loc. Saptasajya, Dhenkanal: The root (10 gm) made into a paste with *mahankalo* (*Trichosanthes bracteata*) root and black pepper and administered twice daily in cholera [3417].

Loc. Durgaprasad, Ganjam: The root paste (10 gm) given in case of indigestion [3437].

Millettia auriculata

Makari siari (Or); *Sindugabuddu* (S)—loc. R. Udaigiri, Ganjam: Root crushed and the juice applied on the scalp to kill lice and ticks [1122].

Mimulus orbicularis

Panitanki (Or)—loc. Astarang, Puri: Plant considered harmful for the growth of rice plants [2330].

Mirabilis jalapa

Rangbano, *Rangban* (Or)—loc. Ragada, Ganjam: Root (8 gm) made into a paste and given once daily for three days and also applied locally in case of piles [3445].

Ocimum bacilicum

Longabaguli, *Nonkabaruli* (Or)—loc. Ganjam: Few plants grown in the fields of *Jonna* (*Sorghum* sp.), Black gram, Green gram and Pigeon pea to repel flies, and other insects. The entire plant dried, powdered and sprinkled over the plants infested with insect pests [2627].

Oldenlandia gracilis

Loc. Simplipal, Mayurbhanj: Root (8 gm) eaten to cure eruptions on belly [387].

Oroxylon indicum

Phamphan (Or) *Pampend* (S)—loc. Ramgiri; R. Udaigiri, Ganjam: Ten grammes of root made into a paste with *Champa*

(*Michelia champaca*) flowers and given to women on the fourth day of menstruation for fertility, It is also administered as a precaution to any recurrence of abortion [1874].

Ottelia alismoides

Panikundri (Or)—loc. Cuttack: Seeds dried in the sun, roasted and eaten by children [2054].

Pedilanthus tithymaloides

Kharsiju (Or)—loc. Kapilas, Dhenkanal: Latex applied to sprains [3420].

Plumbago zeylanica

Dhoba chitaparu, Swet chitaparu (Or); *Sitaparu* (Kondh)—loc. Ganjam: Root (5 gm) kept in the mouth and chewed for cure of aphthae [2135].

Premna latifolia

Gandhana (Or); *Kaligundri* (Kondh); *Orbonda* (S)—loc. Durgaprasad, Ganjam: Leaves cooked as vegetable. The wood used for producing fire. Two pieces of the dried branches taken and the pointed end of one is rubbed vigorously in the socket of the other piece. Some dried silk-cotton ignited by the fire so produced by friction [2905].

Pterospermum xylocarpum

Giriya (Or)—loc. Saptsajya, Dhenkanal: Root crushed and applied to bruises for relieving pain [3519].

Rauvolfia serpentina

Patalgarud (Or); *Bhui kurma* (S)—loc. Adava, Ganjam: A decoction of the root (3 gm), *Banada* (*Zingibar* sp.) and black pepper given to expel intestinal worms in children [3405].

Loc. Ganjam: The root (3 gm) made into a paste and given to children to relieve stomachache and to expel thread-worms [3412].

Sansevieria sp.

Nagoiri (Or)—loc, Ragada, Ganjam: The application of the leaf paste to snake-bite considered a good antidote [3447].

Schefflera venulosa

Takua (Or)—loc. Saptsajya, Dhenkanal: The crushed stem fried in castor oil and applied to contusions [3421].

Scindapsus officinalis

Gajapipauli (Or); *Panchamulo* (Kondh)—loc. Ganjam: Crushed roots of the young plants (10 gm) or seedlings given to relieve stomachache. A preparation of the root consisting of 52 ingredients administered in cough and tuberculosis [3133].

Shorea robusta

Salua (Or)—loc. Ganjam: Small quantity (5 gm) of powdered *jhuna* (resin) taken with hot milk to relieve chest pain and stomachache [3465].

Sida rhombifolia

Bajramuli (Or)—loc. Ramgiri, Ganjam: The root (7 gm) made into a paste with *gorchina* (which is said to be derived from the liver of some cows) and administered for bile complaints in children [1861].

Tenagocharis latifolia

Mundi (Or)—loc. Badarma, Sambalpur: Leaves cooked as a vegetable [2367].

Tephrosia purpurea

Bankulathiya (Or)—loc. Ganjam: Root chewed to relieve toothache. The root powder kept in the mouth for 30 to 60 minutes to cure aphthae [1983].

Thunbergia fragrans

Chakrakedar (Or)—loc. R. Udaigiri, Ganjam: Root considered as a good antidote to snake-bite. The paste of the leaves and roots with rye applied on the point of bite. Leaves (three to four) taken with milk and black pepper in rheumatism [3438].

Trichosanthes bracteata

Makal, Menhankalo (Or)—loc. Dhabaleswar, Cuttack: Root (8 gm) made into a paste with equal quantity of *Etundi* and given with unboiled milk in pneumonia [3452].

Tylophora indica

Mendisag (Or)—loc. Chilka, Ganjam: Decoction of the stem and leaves (10 gm) given with milk to relieve backache [3153].

Uraria alopecuroides

Chintamani (Or)—loc. Surismuli, Ganjam: Leaf paste applied to wounds [2927].

Ventilago denticulata

Pinchuli (Or)—loc. Surismuli, Ganjam: Bark crushed, fried and applied to rheumatic joints for two days [2926].

Vitex leucoxylon

Panijamu, Magarjamu (Or)—loc. Dhabaleswar, Cuttack: Fruit eaten [2124].

Vitex sp.

Charaigudi (Or)—loc. Saptasajya, Dhenkanal: A decoction of leaves (five to six) given in malarial fever [3418].

Zinziber montanum

Ramkedar (Or)—loc. Ragada, Ganjam: Rhizome (8 gm) made into a paste and given twice daily for three days as an antidote to snake-bite. Rhizome made into a paste with rice water (decanted water after cooking rice with little jaggery) and given for diarrhoea [2933].

Zinziber rubens

Bamkachika (Or)—loc. R. Udaigiri, Ganjam: The paste of the rhizome (10 gm) given after heating and also applied to the head in giddiness [1894].

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12

NATIVE FOOD PLANTS OF THE TRIBALS IN NORTHEASTERN INDIA

R.K. Arora[1]

ABSTRACT

The northeastern region of India is ethnobotanically and phytogeographically, a very diverse terrain. Tribals of various ethnic groups dominate the wooded hilly region, where they largely practise shifting cultivation (Jhuming). Land holdings are small and subsistence agriculture prevails; the natives still gather many wild plants for food.

About 300 plant species are used as edible types. Of these, over 25 provide tubers/rhizomes, etc., which are eaten raw or boiled. Over 50 are consumed as greens, and leaves/tender shoots of these are eaten cooked as vegetable; over 10 provide flower buds/inflorescences which are cooked as vegetable; in about 170 ripe fruits which are pulpy and sweet/sub sweet are eaten raw, and many of these are used for pickles/vegetables, when unripe; about 15 have edible seeds and are eaten raw or roasted.

The article presents an account of these wild edible food plants as used by different ethnic groups. An inventory based on plant part used is given. Evidences of folk domestication for some native cultigens are provided, along with some information on the contribution of various ethnic groups towards the evolution of such edible species.

Introduction

The north-eastern region of India is ethnobotanically and phytogeographically a very diverse terrain. Various ethnic groups—Garo, Khasi, Jaintia, Naga, Kuki, Manipuri, Mizo, Chakma, Dafla and others—dominate the wooded habitats of this hilly region, they largely practise jhuming or shifting cultivation. Land holdings are small and subsistence agriculture prevails. The natives still gather wild food plants.

1. International Board of Plant Genetic Resources, New Delhi-110 012.

Since 1970, the National Bureau of Plant Genetic Resources, has been actively engaged in plant explorations in this region, and has carried out agri-horticultural/botanical surveys in Manipur, Mizorum, Meghalaya, Assam, Arunachal Pradesh and Tripura. While working in the tribal villages, surveying tribal courtyards, protected habitats near dwellings and the tribal markets, good information could be collected on the food plants consumed there. Besides this, explorations also yielded clues on the domestication of several native edible plants.

Wild edible plants diversity

It is estimated that in India about 800 species are consumed as food-plants, chiefly by the tribal inhabitants (Singh and Arora, 1978). Of these, about 300 species occur in the north-eastern region (Singh and Arora, 1978; Watt, 1889-99; Kanjilal *et al.*, 1934-40). These plants are listed in Appendix. Based on the plant-part(s) eaten, they can be classified in the following groups: Tubers 30; Green leaves/shoots 54; Flowers 20; Fruits 172; Seeds 20. This diversity includes edible plants from humid subtropical to temperate locations between 500 and 1800 m. A list of these is also included in appendix.

Plants yielding edible tubers/rhizomes

The natives in the north-east consume tubers/rhizomes of about 30 species. They are eaten raw or boiled. Of these, taros and yams (*Alocasia*, *Colocasia* and *Dioscorea*) are widely used. The tubers of *Eriosema chinense*, *Vigna vexillata*, *Flemingia vestita* and *Eleocharis dulcis* are eaten raw; while of *Alocasia macrorrhiza*, *Dioscorea bulbifera* and other species (8 in all); *Colocasia esculenta*, *Houttuynia cordata*, *Lasia spinosa* and *Polygonum bistorta* are boiled and eaten as vegetables. Some of the rhizomatous types like *Polygonatum multiflorum* and *Tacca pinnatifida* are also used likewise for starchy soups/vegetables, while others like *Alpinia*, *Zingiber* and *Curcuma* species are utilized more as condiments. Most of these occur along the borders of subtropical evergreen forests or in sal-mixed vegetation along forest openings.

Plants used as greens: edible leaves/young shoots

Raw or cooked leaves/shoots of over 50 species are used

by the tribals. More widely used are *Alocasia macrorrhiza*, *Colocasia esculenta*, *Enhydra fluctuans* and *Houttuynia cordata*—mostly of hygrophytic habitats, often abundant in waterlogged areas/ditches along forest openings; wild taros are more common in disturbed sites and marginal habitats. In Mizoram, green leafy twigs of *Clerodendrum colebrookianum* are very popular vegetables; they are eaten cooked with rice. The Khasis use *Mussaenda frondosa* and *Cissus repens* and the Mikirs, *Garcinia lanceaefolia*, while the tribals in Arunachal hills use *Phytolacca acinosa* and *Rumex* species. In Manipur, *Perilla ocymoides*, and bordering Nagaland, in Mishmi hills, many species of *Polygonum* are eaten cooked. Occasionally, raw leaves are also consumed, e.g., *Vaccinium serratum*, *V. donianum* and *Oxalis maritima* (often acidic/sour). A few such types are also used as condiments, and it is not uncommon to find leafy twigs of *Clausena excavata*, *Skimmia laureola* and *Cinnamomum* species being sold in town markets (Jawai, Shillong, Imphal). In Manipur and Mizoram, young shoots of *Bambusa tulda* and *Calamus rotang* are boiled and eaten as a delicacy; they are even pickled.

Plants with edible flowers/buds

The young unopened flowers of *Bauhinia purpurea* and *B. variegata*, and of *Musa* species find way to tribal markets, along with the flowering twigs (acidic in taste) of *Vaccinium serratum* and are eaten cooked. The Ukhrul tribals of Manipur use *Vaccinium* flowers to give a sour taste to curries and soups. The flower buds of *Ardisia griffithii* are eaten cooked by the Khasi tribals, and those of *Nelumbo* are preferred by tribals in valleys of these hills (Manipur, Tripura).

Plants yielding edible fruits

Over 170 species provide edible fruits. Mostly, it is the fleshy, sweet/sub-sweetish pulp of the fruit that is eaten raw and the tribals have screened the enormously rich flora of the seasonal rain-forest habitats and picked up edible types, e g., *Garcinia atroviridis* and others (seven species), *Mangifera sylvatica*, *M. indica*, *Myrica esculenta*, *Docynia indica*, *D. hookeriana*, *Diospyros lancaefolia* and others (five species), *Elaeagnus latifolia*, *Syzygium* spp., *Citrus* spp., *Dillenia indica*, *Elaeocarpus*

floribundus and others (six species), *Ficus* spp., *Gaultheria fragrantissima*, *Morus australis*, *Melodinus monogynus*, *Haematocarpus thompsonii*, *Fissistigma polyanthum*, *F. verrucosa*, *Vitis* spp., *Actinidia callosa*, *Alphonsea lutea* and several others. In the higher hills, *Saurauja roxburghii*, and Rosaceous types such as *Prunus cerasioides*, *P. jenkinsii*, *Pyrus pashia*, *Sorbus* species and others, bordering these forests or occupying cleared sites—*Rubus* and *Vaccinium* spp., and *Crataegus oxycantha* and in the *jhum* clearings in lower mountain ranges (1000 m) *Brucea javanica*, *Myrsine capitata*, *Maesa* spp., *Solanum barbisetum*, *Zizyphus*, *Grewia* and *Phoenix* spp. and *Emblica officinalis* are consumed.

The tribals use some of these wild types in dried form and as preserves, e.g., *Myrica* sp., *Rhus javanica*, *Vaccinium* spp., and *Crataegus oxycantha*, and also pickle many unripe fruits particularly of *Elaeocarpus floribundus*, *Mangifera sylvatica*, *Citrus* spp., *Emblica officinalis* and dry the sliced pieces of *Garcinia atroviridis* and other species for their tamarind like taste. They add this to curry preparations. All these types mostly find their way to the town markets. The town tribals prepare from *Docynia*, *Fissistigma* and *Mangifera*, with sugar, tarts/chutneys and jam-like preparations; and quite often also utilize some of them for preparing fresh drinks with sugar, e.g., *Garcinia*, *Citrus*, *Mangifera*, *Myrica*.

Among the tribals, the use of green-pods of wild-beans as vegetable is quite common and young pods of *Mucuna*, *Parkia*, *Vigna* and *Canavalia* species are cooked; *Parkia* is particularly popular in Manipur.

Plants of which seeds are eaten

They roast the ripe or occasionally unripe seeds and eat them as such or mixed with salt, e.g., *Bauhinia vahlii*, *Entada phaseoloides*, *Mucuna prurita*, *Sterculia guttata* and others (five species), *Hodgsonia heteroclita*, *Cirsium lipskyi*, or in boiled form in soups with or without rice, e.g., *Canavalia*, *Mucuna*, *Parkia* and *Vigna* species. In a few cases, the seeds are eaten raw, e.g., *Euryale ferox*, *Nelumbo nucifera* and *Nymphaea nouchallii* mainly by the tribals of valleys in Manipur and Tripura. Some of these edible types are confined to specific areas; *Hodgsonia*—a cucurbit with very large, oil/protein-rich seeds, is eaten chiefly by the Mizo tribals (Arora and Hardas, 1977).

Wild rice occurs in valleys and *Coix lacrymajobi* also abounds in rice fields of marginal habitats, but invariably these are not collected, as the former sheds its grain and only sparse populations are seen; in the latter, predominantly, hard-shelled types with very small kernel occur.

Plants identified for multiple usages—more than one plant-part eaten

In order to find more and more edible types, judicious screening of the native wild kinds, the tribals did and picked up several plants of which they utilise various plant-parts. Some examples are:

Genera/Species	Plant-parts eaten
Alocasia, Colocasia, Houttuynia	Leaves, young shoots, tubers
Alpinia speciosa, A. galanga	Rhizomes, flowers, seeds
Nelumbo, Nymphaea spp.	Rhizomes, leaves, shoots/(stalks), flowers, seeds
Ardisia, Embelia, Garcinia spp.	Leaves, fruits
Bauhinia spp.	Flowers, seeds
Dillenia indica	Flowers, fruits
Vaccinium serratum	Leaves, flowers, fruits
Clausena excavata	Leaves, fruits
Circium lipskii	Leaves, seeds
Parkia roxburghii, Vigna, Mucuna, Canavalia	Young pods, seeds

Impact of shifting cultivation

Shifting cultivation in hills led to a change in vegetation, resulting in the preponderance of secondary growth of different species over those of the natural seasonal monsoon forests. One can conclude that species like *Ardisia crispa*, and *A. polycephala*, *Casearia glomerata* and *C. tomentosa*, *Meliosma pinnata* and *Premna* species, ferns like *Pteridium aquilinum* were picked out of abondoned jhum sites; e.g., the Mikirs along the foothills of Meghalaya eat *Ardisia* species, cooked with rice and fish, and the young fronds of *Pteridium* which are abundant in cleared *jhums*/forests, find their way to the markets and are cooked as vegetable. Plants like *Eriosema* whose tubers are eaten raw, are also common in such habitats, with edible

fruit-types like *Rhus*, *Rubus*, *Emblica*, *Phoenix* and several others mentioned above. It is interesting to note that some of these plants *Ardisia*, *Casearia* and *Meliosma* species—referred above, though of wider distribution (Eastern and Western Ghats), could be screened and identified by the tribals for edible usage only in this region. *Lysimachia candida* is mainly eaten by the Manipur tribals and *Sambucus javanica* by the Khasis and the Jaintias.

Evidences of folk domestication

Among the native edible plants discussed above, the tribal inhabitants of the northeastern region picked up several types which they grew under protection along their huts/dwellings, in their courtyards and this led consciously to the domestication of some of these types as cultigens suited to *jhuming* or shifting cultivation.

Flemingia vestita occurs wild in the Himalayas up to 1800 m, with its eastern limit in the northeastern hills, and its tubers are picked up by the tribals and eaten raw. Interestingly, it is only in the Khasi and Jaintia hills, that conscious folk domestication of this plant occurred, possibly in the 19th century, where now this plant, locally called *Soph-long* is grown as a rainfed crop in *Jhums* (Singh and Arora, 1973). While the wild type has a deep seated tuber, in the cultivated form the tubers are surface-borne and the crown invariably has over four to five tubers, which are soft, thin-skinned, and sweeter. Another interesting example is from grass genus. *Digitaria*, *D. cruciata* occurs wild in the northeastern hills, extending to China. A form of this tall, leafy type with more fruiting, called as var. *esculenta* was picked up as a cultigen by the Khasi natives who grow this in the Shillong plateau (Singh and Arora, 1972) in high hills, at *ca* 1500-1800 m. It is a cold-tolerant grass grown for food and fodder.

Apart from plants of indigenous origin, in several other types of South Asian origin preferred by the northeastern tribals for food, such conscious efforts led to the build-up of a genetic variability which in India occurs maximum in this region (*Coix*, rice bean). The tribals domesticated many soft-shelled forms in *Coix lacryma-jobi*, selecting thin shelled, easy hulling types with bigger kernel and heavy fruiting and the variation now available

in this tract for such forms is enormous (Arora, 1977). *Coix* grains are eaten out-of-hand, pounded and roasted, boiled with rice, maize, and in certain areas (Garo hills, Meghalaya, Nagaland) used primarily for preparing a local beer. Similarly, in rice bean (*Vigna umbellata*) the wild forms are picked up from the disturbed scrub forests and the green pods and more often, ripe seeds are eaten. Maximum range of variability is available now in this cultigen in this tribal belt and it is a popular pulse of the tribals of this region (Arora *et al.*, 1978).

Evidence of protecting other selected edible species is also available. Around the dwellings and margin of courtyards, fruit trees like *Elaeocarpus floribundus*, *Myrica esculenta*, *Garcinia*, *Morus*, *Docynia* and several others are often observed. The tribal courtyards are also rich in *Curcuma*, *Zinziber*, *Alpinia*, *Tacca*, *Colocasia*, *Alocasia* and *Dioscorea* (tuberous/rhizomatous kinds) and *Perilla ocymoides* (leafy types). The popular use of certain types by tribals, has helped building up different forms of such edible types too. Thus in Manipur and Mizoram, the tribals differentiate about three types in *Parkia roxburghii*, on tenderness/hardness, pulp quality and flavour of sap of the pods (not on pod size alone). *Piper peepuloides*, used as a condiment, is a courtyard cultigen of the Khasis of Cherapunji hills. In Mizoram, it is quite common to find few shrubs of *Clerodendrum colebrookianum* in tribal courtyards, which could not be found in other regions. In Mizoram also, in certain areas, the author found an effort to protect *Hodgsonia heteroclita*—an oil/protein-rich cucurbit, used for its seeds, which are eaten roasted (Arora and Hardas, 1977, oil 54 per cent, protein 31 per cent).

Conclusion

In view of the account presented above, it is desirable to undertake detailed ethnobotanical study of this region. Evidently, we are going to find many more plants used by these tribals. Examples of incipient domesticates cited above would require more survey to find out sites from where better types (awaiting exploitation) can be located. Emphasis must also be laid on the preservation of such genetic diversity. It would also be necessary to undertake comparative study of plants and plant parts eaten by various tribals. Such a comparative analysis could bring out more useful information on the

use of same plants by different tribes, apart from new finds.

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Appendix

Wild edible plants used by the tribals of northeastern India

(i) Root/tuberous types

Alocasia macrorrhiza: Boiled corm eaten, also cultivated.

Alpinia galanga: Rhizome boiled in soup-like preparations, also cultivated.

Alpinia speciosa: Rhizome boiled in soup-like preparations, also cultivated (has ginger-like taste).

Asparagus racemosus: Eaten boiled, raw roots in candied form.

Bupleurum falcatum: Boiled roots eaten by Khasis.

Colocasia esculenta: Corm boiled and eaten, also cultivated.

Costus speciosus: Starchy rhizomes eaten boiled.

Curcuma zedoaria: Starchy rhizomes eaten boiled.

Dioscorea bulbifera: Starchy tubers eaten boiled, also of *D. hispida*, *D. puber*, *D. versicolor*, *D. oppositifolia*, *D. pentaphylla* and others.

Eleocharis dulcis: Small tubers eaten raw.

Eriosema chinense: Small tubers eaten raw.

Eulophia campestris: Small tubers eaten raw, also boiled.

Flemingia vestita: Tubers eaten raw, cultivated in K. and J. Hills, endemic crop.

Houttuynia cordata: Small tubers eaten raw, also in curries.

Lasia spinosa: Small tubers eaten raw.

Nelumbo nucifera: Rhizome boiled in soups, curries.

Nymphoides indicum: Rhizome boiled in soups, curries.

Oxalis martiana: Small tubers eaten raw.

Polygonatum multiflorum: Starchy tubers cooked in curries/thick soups by Manipur tribals.

P. verticillatum: Starchy tubers cooked in curries/thick soups by Manipur tribals.

Polygonum bistorta: Boiled tubers eaten.

Sagittaria trifolia Boiled tubers eaten.

Tacca leontopetaloides: Boiled tubers eaten, also cultivated.

Vigna vexillata: Tubers of small carrot-size, eaten raw and boiled.

Zingiber zerumbet: Rhizomes boiled in soups, good flavour.

(ii) Leafy-types eaten as green vegetables

Alocasia macrorrhiza: Leaves, young shoots, eaten cooked.

Ardisia crispa: Young shoots/leaves acidic, eaten raw and also cooked.

A. polycephala: Young shoots/leaves acidic, eaten raw and also cooked.

A. solanacea: Young shoots/leaves acidic, eaten raw and also cooked.

Asystasia neesiana: Leaves cooked as vegetable.

Bambusa tulda: Young shoots, culms pickled.

Calamus rotang: Young shoots, culms pickled.

Casearia esculenta: Leaves, young shoots eaten cooked by the Khasis, Mikirs, also *C. glomerata.*

Cirsium lipskyi: Leaves, young shoots eaten cooked by the Khasis, Mikirs and also by Manipur tribals.

Cissus adnata: Leaves cooked as vegetable; also of *C. discolor, C. repens.*

Clerodendrum colebrookianum: Leaves, tender shoots eaten cooked; also of *C. indicum.*

Codonopsis sp*:* Leaves, young shoots eaten cooked by Khasis.

Conocephalus suaveolens: Leaves, tender shoots eaten cooked.

Cyanotis tuberosa: Leaves, tender shoots eaten cooked.

Dendrocalamus hamiltonii: Shoots boiled and eaten.

Embelia gamblei: Young leaves and shoots eaten boiled; also of *E. naguchia, E. subcoriacea.*

Enhydra fluctuans: Raw leaves as salad; also cooked as vegetable.

Garcinia lancaefolia: Leaves acidic, cooked by Mikirs.

Hedyotis capitellata: Cooked leaves eaten.

Houttuynia cordata: Leaves, young shoots cooked as vegetable, delicious.

Hygrophila salicifolia: Leaves and shoots eaten boiled in soups; also of *H. spinosa.*

Ipomoea aquatica: Leaves, shoots cooked as vegetable.

Lasia spinosa: Leaves cooked as vegetable, soups and curries.

Leea indica: Tender leaves and shoots in curries.

Lysimachia candida: Tender leaves and shoots in curries as vegetable by Manipur tribals.

Maesa chisia: Young leaves/shoots as vegetable.

Malva verticillata: Young leaves/shoots as vegetables, cultivated by Assam tribals.

Medinella rubicunda: Cooked leaves eaten.
Meliosma pinnata: Leaves, tender shoots cooked with fish as vegetable by Mikirs.
Merremia umbellata: Leaves cooked as vegetable.
Monochoria hastata: Leaves, tender shoots cooked as vegetable.
Mussaenda glabra: Tender leaves eaten raw, as salad/in chutney.
M. frondosa: Cooked young leaves/sprouts eaten; also of *M. roxburghii.*
Natsiatum herpeticum: Young leaves/shoots cooked as vegetable.
Nelumbo nucifera: Young leaves/shoots cooked as vegetable.
Oenanthe javanica: Young leaves/shoots cooked as vegetable, also used raw, flavoury.
Olax acuminata: Young leaves/shoots cooked as vegetable by Mikirs.
Oxalis maritiana: Sour leaves eaten raw.
Paedaria foetida: Tender leaves boiled into stews/curries.
Pavetta subcapitata: Leaves cooked as vegetable.
Phytolacca acinosa; Leaves/shoots cooked as vegetable; also cultivated in higher hills by Arunachal tribals.
Picris hieraciodes: Leaves/shoots cooked as vegetable.
Polygonum bistorta: Leaves/shoots cooked as vegetables, in stews/soups; also other species.
Pouzolzia viminea: Leaves cooked by Khasis.
Premna latifolia: Leaves/tender shoots eaten cooked; also of *P. obtusifolia.*
Pteridium aquilinum: Young sprouting fronds cooked as vegetable.
Rhynchotechum ellipticum: Leaves cooked as vegetable.
Rumex maritimus: Leaves/tender shoots cooked as vegetable, soup like preparation.
Sambucus javanica: Tender leaves cooked as vegetable.
Sarcochlamys pulcherrima: Tender leaves cooked as vegetable; also young shoots.
Solanum crassipetalum: Tender leaves cooked as vegetable; also *S. nigrum, S. spirale.*
Solena heterophylla: Leaves cooked as vegetable.
Stellaria media: Tender leaves cooked as vegetable.
Typha angustifolia: Young shoots boiled or stewed.

Vaccinium donianum: Young leaves cooked as vegetable; of *V. serratum*, sour and eaten raw.
Zanthoxylum oxyphylla: Tender shoots cooked as vegetable.

(iii) Buds/flowers/inflorescence

Alpinia galanga: Flowers eaten raw.
Ardisia griffithii: Flowers cooked by Khasis and eaten.
Bambusa bambos: Young buds cooked as vegetable.
Bauhinia purpurea: Flower-buds cooked as vegetable.
Bombax ceiba: Flower-buds, fleshy calyx, eaten raw.
Dichopsis polyantha: Boiled flowers eaten.
Dillenia indica: Boiled flowers eaten.
Dioscorea pentaphylla: Flower-buds cooked as vegetable.
Ensete superba: Flower-buds cooked as vegetable.
Eugenia formosa: Calyx cooked as vegetable.
Indigofera dosua: Flowers cooked as vegetable.
Monochoria hastata: Inflorescence cooked as vegetable.
Nelumbo nucifera: Flower-buds cooked as vegetable, also of *Nymphaea* spp.
Polygonum runcinatum: Cooked flowers and inflorescence eaten.
Rhododendron arboreum: Flowers (petals) sub-sweetish, in jams, cold drinks.
Vacinium serratum: Flowers sour, cooked in curries.

(iv) Fruits—ripe and unripe

(a) Ripe fruits

Actinidia callosa: Acidic pulp eaten.
Aegle marmelos: Aromatic pulp eaten as such or as a drink with sugar.
Aglaia edulis: Sweet, succulent/fleshy aril eaten.
Alphonsea lutea: Aromatic pulp eaten; also of *A. ventricosa*
Ampelocissus barbata: Sweet berries taste like grapes; also of *A. latifolia.*
Antidesma acuminatum: Sub-sweetish pulp eaten; also of *A. khasianum*, *A. thwaitesianum.*
Aphania rubra: Sub-sweetish pulp eaten.
Aporusa octandra: Acid fruit aril eaten raw.
Ardisia thyrsiflora: Sub-sweetish berries eaten; also of *A. polycephala.*
Baccaurea ramiflora: Sweetish pulp eaten, delicious.

Celtis australis: Sweetish pulp eaten, delicious.
Citrus latipes: Acid, juicy fruits eaten raw; also *C. medica.*
Clausena dentata: Sweetish fruit pulp tastes like black currant.
Coriaria nepalensis: Insipid fruit pulp eaten.
Cornus capitata: Pulp sweet, eaten raw/made into preserves, also of *C. macrophylla.*
Crataegus oxycantha: Acidic pulp eaten raw or as preserve.
Cyathocalyx martabanicus: Aromatic sweetish pulp eaten.
Debregeasia longifolia: Sub-sweetish pulp eaten.
Dillenia indica: Sub-sweetish pulp eaten; also of *D. scabrella.*
Diospyros kaki: Sweetish puip eaten; also of *D. lancaefolia, D. ramiflora, D. toposia.*
Docynia hookeriana: Fruits sub-sweet, eaten raw, also as preserve; *D. indica* better in flavour.
Donella roxburghii: Sweets pulp eaten.
Duchesnea indica: Sour pulp eaten, fruit juicy.
Ehretia acuminata: Sweet pulp eaten.
Elaeagnus latifolia: Sub-sweetish pulp eaten; also used in tarts and jellies also of *E. pyriformis, E. umbellata.*
Elaeocarpus lanceaefolius: Sub-sweetish pulp eaten raw, also of *E. prunifolius, E. varunna.*
Embelia sessilifolia: Sub-sweetish pulp eaten raw.
Emblica officinalis: Fruit eaten raw, also pickled.
Eriobotrya angustifolia: Sub-sweetish pulp eaten.
Erioglossum rubiginosum: Sub-sweetish pulp eaten.
Eugenia kurzii: Sub-sweetish pulp eaten.
Evodia fraxinifolia: Sub-sweetish pulp eaten, used in chutneys.
Feronia limonia: Aromatic pulp sub-sweetish, eaten raw or made into drinks.
Ficus auriculata: Insipid fruits eaten raw and preserved; also of *F. racemosa, F. hispida, F. palmata, F. semicordata.*
Fissistigma polyanthum: Aromatic, sub-acidic pulp eaten; also of *F. verrucosa.*
Flacourtia jangomas: Pulp with tarty flavour, eaten raw or as preserve.
Fragaria nilgherensis: Sub-acidic pulp eaten, fruit very juicy.
Garcinia atroviridis: Sub-sweetish pulp eaten; also of *G. cowa, G. lanceaefolia, G. paniculata, G. pedunculata, G. spicata, G. xanthochymus.*
Gardenia latifolia: Sub-sweetish pulp eaten.

Gaultheria fragrantissima: Sweetish pulp eaten by Khasis.
Gelonium mulitflorum: Sweetish pulp eaten by Khasis.
Gironniera cuspidata: Sweetish pulp eaten by Khasis.
Grewia sapida: Sub-sour pulp eaten, also as drinks; also of *G. sclerophylla.*
Haematocarpus thompsonii: Sweet pulp eaten, fruit very juicy.
Holboellia latifolia: Sweet pulp eaten, fruit very juicy.
Horsfieldia amygdalina: Fruit aril sweet, eaten.
Hovenia dulcis. Succulent peduncles, inflorescences, taste like pear, eaten.
Leela crispa: Fruit insipid, eaten.
Litsaea glutinosa: Fruit insipid, eaten.
Maesa argentea: Fruit insipid, eaten, also of *M. chisia.*
Mahonia acanthifolia: Pulp sour, raten, also of *M. napaulensis.*
Mangifera indica: Pulp sour, sub-sweetish, much relished, eaten raw/pickled, also of *M. sylvatica.*
Medinella rucicunda: Fruit insipid, eaten.
Melodinus malabathricum: Fruit insipid, eaten, tastes like black berry.
Melastoma monogynus: Berries fleshy, sub-sweetish, eaten.
Mesua ferrea: Fruit insipid, eaten.
Morus australis: Fruit fleshy, sweet, eaten; also of other *Morus* spp.
Myrica esculenta: Fruit eaten raw or made into a drink.
Myrsine capitellata: Fruit insipid, eaten.
Olax nana: Fruit insipid, eaten, also of *D. cuspidata.*
Parthenocissus himalayana: Pulp sub-sour, eaten.
Pegia nitida: Pulp sub-sour, eaten, aromatic.
Phoenix acaulis: Fleshy sweet pulp eaten.
Pinanga hookeriana: Fleshy sweet pulp eaten.
Protium serratum: Sub-sweetish pulp eaten.
Prunus cerasioides: Sub-sour/acidic fruits eaten; also of *P. cornuta, P. jenkinsii, P. napaulensis, P. undulata.*
Pyrularia edulis: Fruit tastes like guava, eaten.
Pyrus pashia: Flavour and taste like pear, eaten.
Randia spinosa: Berries eaten occasionally by Assam tribals.
Rhus javanica (=*Brucea javanica*): Sub-acidic pulp much relished.
Rosa gigantea: Soup hips eaten.
Rourea minor: Red aril eaten.
Rubus b florus: Sweet juicy berries eaten, also of *R. lasiocarpus.*

Salacia salacioides: Pulpy, gelatinous, eaten.
Saurauja cerea: Sub-sour berries eaten; also of *S. napaulensis*, *S. panduana*, *S. roxburghii.*
Solanum barbisetum: Berries pulpy, eaten.
Sorbus aucuparia: Pear-like fruit, sub-sweetish, eaten; also of *S. vestita.*
Stixis suaveolens: Sweet aromatic pulp eaten.
Streblus indicus: Insipid fruit eaten.
Syzygium aqueum: Sub-acidic pulp eaten, also *S. cumini*, *S. mappaceum.*
Tetrastigma lanceolaria: Sub-acidic berries eaten.
Uvaria cordata: Fruit insipid, eaten.
Vaccinium donianum: Sub-acidic pulp eaten; also of *V. griffithianum*, *V. sprengeli.*
Viburnum colebrookianum: Sub-sour fruit eaten, also of *V. cotinifolium*, *V. grandiflorum.*
Vitis lanata: Succulent berries eaten, sub-sweetish; also of *V. rumicisperma.*
Willughbeia edulis: Acidic pulp eaten.
Ximenia americana: Sub-sweetish pulp eaten.
Zizyphus apetala: Sub-sweetish pulp eaten, also of *Z. funiculosa*, *Z. incurva* and others.

(b) Unripe fruits eaten

Artocarpus heterophyllus: Fruit pickled, cooked as vegetable.
Dillenia indica: Fruit cooked in curries.
Elaeagnus umbellata: Fruit cooked in curries, also pickled, also *E. floribundus*, *E. prunifolius.*
Emblica officinalis: Fruit pickled, also made into sweet preserves.
Ensete superba: Fruit pickled.
Ficus auriculata: Fruit cooked in curries.
Garcinia atroviridis: Dried sour rind in curries; also whole fruit, *G. cambogia*, *G. pedunculata.*
Gardenia campanulata: Fruit eaten cooked; also of *G. turgida.*
Managifera sylvatica: Fruit pickled; also cooked in curries like *M. indica.*
Momordica cochinchinensis: Fruit cooked as vegetable; also of *M. dioica.*
Morinda umbellata: Fruit used in curries.
Moringa oleifer: Fruit pickled.

Mucuna prurita: Fruit (young green pods) cooked as vegetable.
Parkia roxburghii: Fruit (young green pods) cooked as vegetable.
Randia uliginosa: Fruit (young green pods) cooked as vegetable.
Solanum kurzii: Fruit (young green pods) cooked as vegetable; also of *S. spirale* and others.
Sterculia indica: Fruit (young green pods) cooked as vegetable.
Trichosanthes dioica: Fruit (young green pods) cooked as vegetable.

(v) Seeds

Artocarpus heterophyllus: Seeds roasted and eaten.
Bauhinia vahlii: Seeds roasted and eaten.
Castanopsis purpurella: Nuts eaten raw, also of *C. indica*.
Cirsium lipskyi: Aromatic seeds eaten raw.
Entada phaseoloides: Large seeds roasted/boiled and eaten.
Euryale ferox: Seeds eaten raw/roasted.
Hodgsonia heteroclita: Seeds roasted and kernel eaten, much liked by Mizo and Manipur tribals.
Mucuna gigantea: Seeds boiled and eaten; also *M. monosperma*, *M. prurita*.
Parkia roxburghii: Roasted seeds eaten.
Sterculia guttata: Roasted seeds eaten; also of *S. versicolor* and others.
Vigna umbellata: Seeds boiled and eaten, also of *V. capensis*, *V. pilosa*.

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13

OBSERVATIONS ON ETHNOBOTANY OF THE MONPAS OF KAMENG DISTRICT, ARUNACHAL PRADESH

D.P. Dam[1] & P.K. Hajra[2]

ABSTRACT

The present article deals with the plants used by the Monpa tribals, of Kameng district in Arunachal Pradesh. The authors gathered this data during their field trips.

The articte includes some commonly cultivated and wild plants used for food, medicine, construction of houses, etc.

For each species, botanical name, vernacular names and uses are given. Altogether 76 species belonging to 65 genera are enumerated.

Kameng is the westernmost part of Arunachal Pradesh with Bhutan in the west, Tibet in the north, Subansiri district in the east and Darrang district of Assam in the south. It stretches between 91°45′-93°15′ longitude and 26°45′-28°00′ latitude. The whole area is mountainous. The highest peak Gorichen (7,500 m) is located in the Tawang subdivision. Kameng Chu, Tenga Chu, Tawang Chu, Nyamtjong Chu are the main rivers in the district. The average annual rainfall is between 82 and 100 cm. Heavy snowfall occurs in some places during November to March. The district is the home of tribal people like Akas, Daflas, Monpas and Sherdukpens (Pl. 13.1).

The authors, while on a footmarch along the bridle path from Kalaktang to Tawang via Phudong in the hilly tracts of Kameng,

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came across a tribe known as Monpa, usually concentrated in the northwestern part of the district. The present article deals with the plants used by the Monpas only. Monpas are socio-economically still primitive with existence of barter system and dependence on folk medicines given by village doctor (Bonpa).

They use several raw materials like wood, stone, mud and bamboos for the construction of their houses. The roof is made of split bamboo and cane. *Dendrocalamus* spp. and *Phyllostachys manni* are the main bamboos used for this purpose, while for the planks and beams the timber of *Pinus wallichiana*, *Quercus griffithii*, *Persea odoratissima*, *Acer campbellii*, *Engelhardtia spicata*, etc., are used. The walls are made with mud (*Jinchang*) and stone (*Lung*). Locally the stone houses are known as *Kharfai* and the wooden houses are known as *Pang Kang*.

Their main source of water are the streams (*Manchuri*). From there, small boys carry water in *Demchelang* (Bamboo-Chunga) or in cane-basket (*Sow*).

Agriculture is the main occupation of the Monpas. They are basically shifting cultivators. But many of them, due to the non-availability of more forest land switched over to permanent cultivation and now practice terracing, mixed cropping etc. This helps the fertility of the soil, control on soil erosion and also maintains a coverage all through the year. They usually cultivate legumes like *Glycine max* (*Lilu*), and *Phaseolus torosus* (*Gidilipi*), with *Zea mays* (*Phinnang*), *Pennisetum americanum* (*Yangpah*), *Fagopyrum cymosum* (*Brogma*), *Eleusine coracana* (*Kongpu*), and *Oryza* sp. Potato and apple cultivation is also introduced in some places. They often grow *Pyrus perisica* as a fruit plant and *Cucurbita pepo*, *Capsicum annum*, *Zanthoxylum oxyphyllum* as vegetables and spices. They preserve red chillies, etc., on the roof of their huts.

A very interesting primitive mode of the application of fertiliser (in the true sense, nutrients) as a result of shifting cultivation was witnessed in Tawang. *Quercus griffithii* leaves are collected in bags from remote forests and dumped near their privies to cover the night soil. When these leaves start

decomposing, they are scattered on the cultivable fields in order to enrich them.

Preparation of local drinks, i.e., *Bunkchung* and *Arrack*

Raw materials: (i) *Phinnang* (*Zea mays*), (ii) *Kongpu* (*Eleusine coracana*), (iii) *Mochalu* (*Chenopodium album*).

These ingredients are mixed in water and boiled in an aluminium vessel till all water goes away. It is kept as such for about half an hour. Then the above mixture is poured in a *Dala* (round utensil made of bamboos) or *Sethi* (square utensil). After proper cooling, *Phum* (cake containing alkaloids), which is normally procured from the foothills of the Assam-Arunachal border, is added. After thorough mixing, it is poured into another container, the mouth of which is tied with a piece of cloth, so that no air can get in. It is kept for two to three nights for fermentation. Ultimately, the fermented mixture is kept in an earthen pot (*Tekeling*). Sufficient water is poured to prepare *Bunkchung*.

In the case of *Arrack*, the above fermented *Bunkchung* is diluted with water and is poured in a pot (*Arathaw*). *Arathaw* is made of steel or aluminium, inside which three wooden or bamboo pieces are placed in a slanting position, making a common angle down. Over that and little below the mouth, an earthen vessel containing little water is placed. The system thus made is tied up with an airtight lid (*Surgang*) made of cloth. Over that is kept a vessel (*Dabur*) containing water. This water is to be changed three to four times. Then it is kept over an oven (*Thapchang*). Finally it is to be tasted; if it is found very strong and concentrated, then the *Dabur* water is to be changed more frequently.

Bunkchung is served generally in a bamboo tumbler(*Kitong*), while the *Arrack* is served in a small wooden cup.

The following is an enumeration of some plants used by the Monpas in their day-to-day life. The information was collected from the village headman and local medicineman with the help of an interpreter. The plants are arranged alphabetically according to botanical names, followed by local names and their uses.

The voucher specimens are deposited in the Kanjilal herbarium (ASSAM) Shillong.

Enumeration

Acer campbellii (*Kapathi*): Valuable timber tree.

Acer hookeri (*Karsing*): Used for making utensils, etc.

Aconitum laeve (*Siachndo*): The root is poisonous. Local people sometimes secretly mix the root with drinks to deceive and kill the enemies (based on a recent report from Tawang).

Aconitum ferox (*Chandu*): Given in very small quantity to cows and horses for loss in weight. Used in small quantity in treatment of cold.

Aconitum fletcherianum (*Menchine*): Used for poisoning.

Aconitum novoluridum (*Bhonga-karpa* and *Bhonga-Marpo*): Used as poison.

Acorus calamus (*Sitha*): Used on cuts. Used to be collected in large quantities by Tibetan doctors in olden days.

Aesandra butyracea (*Fiw*): Fat extracted from the seed is edible.

Amaranthus caudatus (*Yacherang*): Cultivated on hill slopes for seeds which the Monpas use as cereal like rice.

Amaranthus hybridus subsp. *cruentus* var. *paniculatus* (*Yacherant*): Seeds are eaten.

Artemesia nilagirica (*Nilum*): Decoction of leaves used for sores.

Begonia josephi (*Chulen Derm*): Bulbs used for stomach pain.

Bergenia ciliata (*Brahla*): Use for cough and cold.

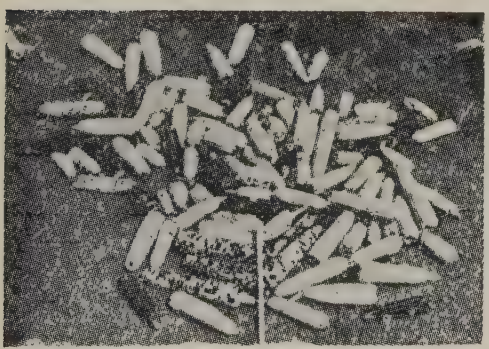
Bergenia ligulata (*Brahgla*); Leaves and roots used on cuts to stop bleeding.

Boenninghausenia albifera (*Nukmman*): Roots are powdered, made into a paste with water, and applied on old wounds.

Buddleja asiatica (*Agia-chita*): Leaves used in preparation of a drink called *Lau-pani*.

13.1 Tribals of Kameng district, Arunachal.

13.2 *Cucurbita maxima.*



13.3 *Zea mays.*

Capsicum annuum (*Solu*): Used as vegetable.

Cardamine macrophylla: Leaves used as vegetable.

Chenopodium album (*Mochalu*): Seeds are boiled and eaten either as a substitute for rice; or mixed with rice to make it more palatable.

Cinnamomum tamala (*Chipsing*): Leaves used as spice.

Coptis teeta (*Ringo*): Used for cough and cold.

Cornus capitata (*Canchasing*): Ripe fruits are edible.

Cucumis sativus (*Tiyansh*) (Hindi): Cultivated for its fruit.

Cucurbita maxima (*Brumcha*): Commonly cultivated for its fruit and used as vegetable (Pl. 13.2).

Cymbidium longifolium (*Kharama*): Flowers used as vegetables.

Daphne Papyracea (*Shugu-Sheng*): Bark used for making fine paper.

Daphniphyllum himalayense (*Okhar*): Fruits edible.

Dendrobium hookerianum (*Pinmaraha*): Flowers used as vegetable.

Desmodium oblongum (*Singchangba*): Dye-yielding plant.

Dioscorea bulbifera: Tubers are eaten, after removing the bitter and acrid substances by boiling and thorough washing in running water.

Dioscorea pentaphylla: Tubers are edible after boiling and washing. Flowers and leaves are boiled and eaten as vegetable.

Diospyros peregrina (*Ambre*): Fruits edible.

Docynia indica (*Losu*): Fruits eaten both raw and cooked.

Elaeocarpus varunua (*Yearga*): Fruit eaten; wood used in making spoons, ash trays etc.

Elatostema dissectum: Leaves and fruits eaten, raw or cooked.

Eleusine coracana (*Kongpu*): Seeds eaten and also used for making local drinks.

Emblica officinalis: The fruits are sour and are eaten raw or cooked.

Fagopyrum cymosum (*Braghma*): Monpas prepare flour and *chapatis* (bread) from the seeds.

Gaultheria nummularioides: Fruits eaten by Monpas.

Glycine max (*Lihu*): Cultivated for its pods to ensure fertility of the soil.

Illicium griffithii (*Munshing*): The fruits are used as spice due to thier aromatic and carminative properties.

Impatiens amplexicaule (*Chi*): The oil extracted from the seed is used as varnish.

Indigofera tinctoria (*Kimre*): Medicinal; pounded roots are applied on wounds infested with worms and on foul ulcers.

Juniperus forbesii (*Suppasang*): Used for making *Dhoop* sticks.

Juniperus recurva (*Sakpu*): Used as incense.

Kydia calycina (*Samlaktang*): The lac of this plant is used as dye for colouring clothes, etc.

Lindera neesiana (*Jamkanuesing*): The oil extracted from the seed is edible.

Litsaea cubeba (*Akmer*): Fruits yield edible oil.

Litsaea kingii (*Chiangmar*): Fruits yield hair-oil.

Madhuca longifolia var. *latifolia* (*Fin*): Seeds yield edible oil.

Michelia doltsopa: Timber suitable for furniture and planking.

Murraya koenigi (*Kairseng*): Leaves used as spice.

Nardostachys grandiflora (*Phos*): Local dhup plant.

Pennisetum americanum (*Yangpah*): Extensively cultivated for seeds which are boiled and eaten and sometimes fried.

Persea kurzii (*Kauloh* or *Masehkauloh*): Valuable timber tree.

Persea odoratissima (*Safed kauloh*): Wood used for making utensils, boxes, etc.

Phaseolus torosus (Gidilipi): Used as vegetable, commonly cultivated on hill slopes.

Picrorhiza kurroa (Khonglen): Roots are used in influenza and diarrhoea in human beings and even animals.

Pinus wallichiana (Leng-chong-sing): The wood is used for construction work.

Podophyllum hexandrum: Used to cure tumour. Rhizome and roots are used as purgative and in skin diseases.

Quercus griffithii (Bajran): The timber is used for construction work.

Rheum emodi (Churchume): Root used to be collected by Tibetan doctors.

Rhododendron anthopogon (Balu): Used as incense.

Rhus griffithii (Triseng): The oil extracted from seed is edible.

Ribes glaciale (Shersumpasing): Fruits are eaten.

Rubia cordifolia (Tsu): Used to be collected by Tibetan doctors. Used also for extracting varnish and tanning materials.

Securinega virosa (Nyeze): Fruits mixed with dal eaten to get relief from stomach pain.

Skimmia laureola: Leaves used in smallpox.

Smilacina fusca (Yep): Leaves used as vegetable.

Swertia chirayita: Plant is used for stomach ache.

Thalictrum minus (Mabjedung): Root used for fever and eye diseases.

Vaccinium nummularia (Sim-sing-meto): Wood useful for making utensils like spoons, plates, etc.; wood very good for carving.

Vigna sinensis (Libi): Commonly cultivated for seeds. The villagers boil the seeds and cover it for seven or eight days. Then they mix green chillies and take it as curry.

Zanthoxylum oxyphyllum (Yer): Young shoots are cooked and eaten as vegetable. Fruits used as spice.

Zea mays (*Phinnang*): Local drink *(Bungchung)* made from cooked seeds by fermantation process and served by young women to their guests as a mark of respect. This cultural function is called *Dhumchang*. Refusal to accept the drink leads to discontent among the local tribes and the guests are sometimes forced to drink (Pl. 13.3).

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14

ETHNOBOTANICAL NOTES ON THE MIRIS (MISHINGS) OF ASSAM PLAINS

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ABSTRACT

The Miris or Mishings are a tribe living in the Brahmaputra Valley of Assam. The use of plants by Miris for their food, drinks, medicine and construction of houses, etc., is the subject of this article.

The Miris are basically agriculturists, but majority of them are still in primitive state of economic life and depend on many wild plants for their day-to-day needs.

The information on the plants is given under seven broadscatagories, viz., plants used for: (1) medicine, (2) local drinks. (3) construction purposes and fishing implements, (4) fruits; vegetables, etc., (5) plants associated with festivals, (6) plants used as substitute for soap, and (7) those used for rearing silk-worms.

This article deals with plants used by the Miris or Mishings—a tribal population of the Brahmaputra Valley. They are generally concentrated in Upper Assam to the north of the Brahmaputra river, i.e. from Sadiya to Tejpur including the Majuli Island. Most probably they migrated down the valley of Dihong river from Arunachal Pradesh and gradually made their permanent homes in the Brahmaputra Valley. There is a legend that on their way down they crossed a rapid (*Jiri*) with the help of two huge lianas of golden-yellow colour (*Maying and Mankong*). They usually refer to these lianas as

1. *Botanical Survey of India, Dehradun-248195.*
2. *Botanical Survey of India, Meghalaya-793003.*

two golden ladders by which their forefathers came down from heaven. These lianas may be some *Calamus* species.

The Miris are basically agriculturists but majority of them are still in a primitive state of economic life and depend on many wild plants for their day-to-day life.

They have their own dialect but nothing is known about the Miri alphabet.

The following information on uses of plants was collected from the local medicineman and village headman of Pava Sanctuary area during authors, field trip to North Lakhimpur. Besides living plants, voucher specimens were collected and are deposited in the Kanjilal Herbarium, Shillong (ASSAM). The information is given under the following seven broad catagories, based on uses of plants:

(1) medicines, (2) preparation of local drinks, (3) various construction purposes and fishing implements, (4) fruits, vegetables, etc., (5) festivals, (6) substitute for soap, and (7) rearing silk-worms.

For each species, the botanical name, vernacular names and uses are given. Descriptions of the plants are avoided because they are available in common floras. The locality and field numbers are also not given as the plants are collected mostly from one locality.

(1) Medicine

Ageratum conyzoides (Namin-ing): Leaves and fruits used to prevent bleeding.

Ard sia solanacea (Chauldhoa): Bark after making into paste applied on snakebite.

Asparagus racemosus (Biokkuchare): Roots used for stomach troubles.

Averrhoa carambola (Kordoi): Ripe fruits used for dysentery.

Barringtonia acutangula (Hijal): Branches used for tothache.

Calotropis gigantea (Akon): The milky juice used as purgative; leaves after crushing are applied on the burn injury or swelling; the bark of the root given for dysentery.

Carallia brachiata (Thekera): Fruits used for stomach trouble.

Casearia vareca (Saben-bukben-esing): Paste of the fruit given as vermifuge and the juice dropped in the ear in ear-troubles.

Costus speciosus (Jamiakhunti): Roots along with the roots of *Bombax ceiba* given to a dying person.

Crinum amoenum (Jah-jak): Rhizome used as a medicine in stomoch troubles and for caterpillar infections to reduce swelling,

Cynodon dactylon (Dubari): Mixed with nine other plants and used to cure stomach-ulcers.

Dillenia indica (Champa, Olung): The juice of the fruit used in weakness.

Floscopa scandens (Kona-himlu): The juice of the stem applied to inflamed eyes.

Fragaria indica (Bukjer): Fruits applied on tongue-ulcers.

Garcinia kydia (Tarak-esing): Juice of fruits given in dysentery.

Garcinia pedunculata (Tabing-esing): Sour fruits menicinal.

Holarrhena antidysenterica (Dudkhuri, Dhutkhuri): Bark and seeds used for dysentery.

Ichnocarpus frutescens (Jorakuchare): Whole plant used on bone fractures.

Jasminum amplexicaule (Dosipiri): Used for stomach-ulcers.

Leucus lavandulaefolia (Jhui): Young leaves used to stop bleeding from nose.

Litsaea monopetala (Rogu): Leaves used on boils.

Mesua ferrea (Naor): Leaves.used for making a medicinal juice called *Enge*.

Myristica kingii (*Mijingicum-esing*): Gum from the fruits used on mouth-sores.

Naravelia zeylanica (*Rammam-riube*): Stem used as a tooth-brush to cure toothache.

Ocimum sanctum (*Tulsi*): Leaves used for cold and cough.

Oxalis corniculata (*Tengeohi-tenga*): The plant used as a cure for stomach troubles.

Paederia foetida (*Paduri-lota*): Juice of leaves used for diarrhoea and dysentery.

Pandanus odoratissimus (*Lidikarang*): Stem used on ulcers of cows and other domestic animals.

Piper longum (*Piplu*, *Pipul*): Root used in improving digestion.

Polygonum strigosum (*Bihalangani*): Leaves used for skin diseases.

Scoparia dulcis (*Dirichampair*): Root used for removal of the placenta.

Viburnum colebrookianum (*Giuporang-esing*): Pounded leaves used to cure old sores.

(2) In preparation of local drinks (*Apong* or rice-beer)

Like other hill-tribes, the Miris of the plains have a great weakness for *Apong* (rice-beer), which is their local national beverage and has a characteristics smell and sweetish taste. They use two different types of *Apong:* (1) *Nogin Apong* and (2) *Poro Apong*. These differ slightly in colour, taste and method of preparartion. The *Nogin Apang* is whitish and fermented from boiled rice. But the *Poro Apong* has a dark-green colour due to the alkaline preservative base added to the boiled rice. The alcoholic content of *Nogin Apong* is only 4 per cent buts it nutritive value is very high (Pegu, 1956). The Miris offer these drinks to their guests. The drinks are harmless when taken in little quantity.

Different parts, as mentioned below, are collected and dried in the sun. The dried plant-parts are then powdered and

mixed with rice powder to prepare cakes. These cakes are used for fermentation of rice.

Ageratum conyzoides (*Namin-ing*): Whole plant.

Artocarpus heterophyllus (*Belang*): Young leaves.

Centella asiatica (*Atina*): Whole plant.

Cinnamomum bejolghota (*Seerang-esing*): Leaves.

Cissampelos pareira (*Boing*): Whole plant.

Clematis cadmia (*Bon-jhalukia*): Root.

Clerodendrum viscosum (*Pumi-aye*): Young leaves.

Costus speciosus (*Jamia-khunti*): Leaves and stem.

Cyclosorus extensus (*Ribo*): Fronds.

Duchesnea indica (*Bukjer*): Whole plant.

Emblica officinalis (*Amalaki*): Fruits.

Hydrocotyle rotundifolia (*Ajane*): Whole plant.

Jasminum amplexicaule (*Dosipiri*): Leaves and bark.

Lycopodium cernuum (*Kopo-dhekia*): Leaves.

Lygodium japonicum: Fronds.

Mussaenda roxburghii (*Bilangai*): Leaves.

Oldenlandia diffusa (*Bon-jhalukia*): Whole plant.

Oryza sativa (*Am*): Seed.

Piper longum (*Pipali*): Leaves.

Psidium guajava (*Kadam*): Young leaves.

Saccharum officinale (*Tabot*): Leaves make Apong more sweet.

Scoparia dulcis (*Butburi*): Whole plant.

Setaria verticillata (*Khagori*): Mixed with *Centella asiatica* used for fermentation.

Spilanthes paniculata (*Marsang*): Leaves.

Stephania hernandifolia (Boiong): Leaves.

Uncaria sessilifructus: Leaves.

Xanthium strumarium (Tankam): Young leaves and fruits.

Xylosma longifolium (*Motagaling*): Young leaves.

(3),Various construction purposes and fishing implements

They build their houses on bamboo platforms (*Chang*) raised about 1 to 1.5 m above the ground to protect their houses from flood. They use thatch, split bamboo, wooden posts and cane.

Fishing (*Ongo-niknam*) is very popular amongst the Miris and they use many kinds of fishing implements. Miri women-folk Pl. 14.1 prefer *(Zurki (Polo)*—made of bamboo splits and cane, and *Chaloni*—made of bamboo and net. Besides these, the men-folk use many other instruments; of these *Dirdang* and *Porang* are the two implements made of strong, split bamboo; also a cross-bow device (*Di-jamborok*) made of split bamboo and arrows made of light bamboo or *Khagori* (*Setaria verticillata*). The *Di-bung* is another implement made of long bamboo, measuring about 3.5 to 6 m long.

Other species commonly used are:

Anthocephalus chinensis (Nipang-lulang-esing): For making boxes and planking.

Artocarpus heterohpyllus (Belang): For making furniture and planking.

Arundo donax (Nalani): For thatching.

Bambusa balcooa (*Pindui*): For making houses for chickpea, and split bamboo for houses.

Bombusa tulda (Kami): For construction of various household materials.

Bombase ceiba (Singul): For furniture and planking.

Calamus crectus (*Pitil*): For making houses for chicken.

Calamus floribundus (Jojin): For various construction works.

Caryota urens (*Siwa*): Fibrous leaf base for tinder.

Dillenia indica (*Champa, Olung*): For making boats (*Etlung, Otlung*).

Ehretia acuminata (*Sishu-paying*): For making agricultural implements.

Euodia meliaefolia (Bora-esing): For making handlooms.

Flacourtia jangomas (*Poniol*): For making agricultural implements.

Garuga pinnata (*Bonkung-esing*): For various construction works.

Grewia sapida (*Barbe*): Bark for making rope.

Maesa indica (*Siutil*): For various construction works.

Mangifera indica (*Kedi*) : For furniture and planking.

Naravelia zeylanica (Ramnam-riube): Stem twisted and used as rope.

Saccharum sp. (*Tase*): For thatching.

Bombax ceiba (Singul): For furniture and planking.

Streblus asper (Bulat): For construction of buildings, etc.

Syzygium cumini (*Golapi*): For agricultural implements and construction of building, etc.

Terminalia bellirica (Silok): For making agricultural implements, construction of buildings, furniture, etc.

Terminalia chebula (Hilika): For making husking machine (*Khepar*).

Trewia nudiflora (*Belong*): For construction of buildings.

(4) Fruits and vegetables, etc.

The Miris are basically agriculturists and besides *Ahu* paddy, they cultivate many plants for their food and vegetables. A list is given as follows:

Areca catechu (Chali): For nuts.

Artocarpus heterophyllus (*Belang*): For fruits.

Benincasa hispida (*Parotapa*): For vegetables.

Capsicum annuum (*Mirchi*): For fruits.

Cinnamomum bejolghota (*Seerang-esing*): For spices.

Citrus medica var. *acida* (*Ching-kin*): For fruits.

Coriandrum sativum (*Ahari, Apu*): For spices.

Cucurbita maxima (*Migantopa*): For vegetables.

Malachra capitata (*Lopha*): For vegetables.

Morus alba (*Nuni*): For fruits.

Piper betle (*Pan*): For leaves.

Psidium guajava (*Kadam*): For fruits.

Rorippa indica var. *benghalense* (*Petu*): For oil and vegetables.

Solanum melangena (*Okan*): For vegetables.

They also use wild plants for their food, etc. For example.

Calamus floribundus: Fruits are eaten raw. (PL. 14.2)

Clerodendrum viscosum (*Pumi-aye*): Young leaves used as vegetables.

Cordia wallichii (*Sirma, Sumang-asing*): Fruits edible.

Cyclosorus extensus (*Ribo*): Fronds used as a substitute for tea.

Emblica officinalis (*Amalaki*): Fruits edible.

Ficus hispida (*Takpiang, Takpia*): Fruits and young leaves edible.

Litsaea monopetala (*Rogu*): Leaves used as vegetables.

Mussaenda roxburghii (*Soklati*): Leaves used as vegetables.

Myristica kingii (*Mijingikum-asing*): Kernel of the fruits used as a substitute for arecanut.

(5) In festivals

Miris have their own religious belief which is commonly known as 'animism', i.e., worship of different evil spirits. But

14.1 Miri women of Assam

14.2 *Calamus flor ibundus*

due to the influence of various religious faiths of the people of the Assam plains, their own religious faiths or beliefs have changed to some extent. Like other people of the plains, they use different plant-parts for festivals, e.g.;

Flemingia strobilifera (*Siring-sarang*): This is used during *Rangali Bihu* when the people bathe their cows and beat with this plant to protect them from skin diseases for the entire year.

Rhynchostylis retusa (*Kopou-phul*): The flowering spike used by young girls to decorate their hair during the *Rangali Bihu* festivals.

Terminalia chebula (*Hilika*): Fruits used as *rosaries* for the child.

(5) Substitute for soap

Gardenia campanulata (*Dhubui-khola*): Fruits after boiling used for washing purposes.

Sapindus mukorossi (*Manichal, Haitaguti*): Fruits after boiling used for washing, mainly their local dresses made of Eri and Muga silk.

(7) For rearing silk-worms for thread

They cultivate the following plants in their kitchen garden for rearing the caterpillars:

Morus alba (*Nuni*): Leaves and stem.

Ricinus communis (*Era*): Leaves and stem.

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15

PLANTS IN THE FOLKLORE AND FOLK LIFE OF THE KARBIS (MIKIRS) OF ASSAM

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ABSTRACT

The Karbis are a tribe inhibating the mountainous regions of Assam. More than 350 plants are related with the folklore and folk life of the Karbis.

Folklore: The role of certain plants like, *Garuga pinnata*, *Croton joufra*, *Lagenaria sicerarea* in their beliefs and customs is discussed.

Folk life: The uses of wild plants as subsidiary food, for shelter and medicine, are discussed. For example, kernel of *Entada phaseoloides*, bark of *Premna latifolia*, base of rachis of *Angiopteris evecta*, etc., as subsidiary food, use of such materials as leaves of *Calamus erectus, C. latifolius*, *Daemonorops jenkinsianus*, etc., for thatching, and bark of *Sterculia villosa*, *Trema orientalis* as binding materials in house-building; powder of dry fruits of *Brucea mollis* in malarial fever, leaf-juice of *Clausena excavata* in muscular pain, root decoction of *Ixora acuminata* as galactagogue, etc., as medicines are significant.

In addition, plants used for tattooing, e.g , *Baphicanthus cusia*, *Croton caudatus*, *Lasianthus sikkimensis*, etc., and in worship e.g., *Castanopsis indica*, *Dracaena angustifolia*, *Phlogacanthus thyrsiflorus*, etc. are also discussed.

Introduction

The Karbis are a semi-nomadic hill tribe of Assam. They inhabit the district of Karbi-Anglong which lies between 25°30′ -26°41′ N and 92°70′-93.53′ E.

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The area is largely mountainous; the altitude varies from 200 m to more than 1,300 m. It has an area of 10,332 sq km. Approximately 45 per cent of the total area is under forest.

Out of the total population of *c.* 380 thousand; 55 per cent belongs to different tribal groups. Numerically, next to Karbi, Dimasa Kachari, Lalung, Kuki and Rengma Naga are other major ethnic groups of the region. Karbis have characteristic dress. (Pl. 15.3; 15.4).

The objective was to study the flora of the region and to evaluate the relationship between the inhabitants and their plant surroundings. It is well known that the uses to which the tribal people put the plants of the area, sometimes give clues to new findings (De, 1968; Jain, 1964, 1972; Schultes, 1960, 1962). With this view the author undertook a study of the relationships of plants with the life of Karbis.

Jain (1964, 1967), Reis (1962) and Schultes (1960, 1962) have mentioned the various tools for etnnobotanical research. The methods recognised for this purpose can be divided into two categories: (1) Ethnobotany of the present—through extensive field study among the aboriginals, and (2) Ethnobotany of the past. Glimpses of ethnobotany of the past can be obtained by the study of (a) herbarium and museum materials, (b) old literature, and (c) archaeological remains.

Field work was carried out in several selected habitats of the Karbis in the district. The areas taken up for study were those where concentration of the Karbis is believed to be above 60 per cent and habitats isolated from urban population as far as road communication is concerned. Several weeks were spent among the local people in each area of study and a close uses of the plants as well as their names was made in the study of field.

To eliminate any chance of error in identification by mixing of specimens and their uses, the particular specimen, which was the basis of discussion and information from the informant, was brought to herbarium and identified. These specimens were dried, poisoned and mounted as per standard methods (Jain and Rao, 1976) and deposited as voucher specimens in the Central National Herbarium (CAL) in Calcutta and the herbarium at Shillong (ASSAM).

15.1 Karbi women carrying fuel wood, Assam

15.2 A Karbi village market

15.3 Karbi woman in traditional dress

15.4 Karbi boy in traditional dress

15.5 A vendor in a village market in Dolamara, Assam

15.6 Karbis doing divination of cause of disease with pieces of urmeric and shell 'Cowries'

15-7 A raised dwelling of Karbis

15.8 A Karbi Basket called 'Hakkhalun'

15.9 Household articles—bamboo tumblers, paddles, and bowl (top)

During the stay in field, festivals and other ceremonial occasions, where plants are sometimes used, were attended. Village markets were visited to witness and to record the plant products sold in the market (Pl. 15.2, 15.5)

Articles of various plant materials, were observed and in many cases brought for the museum (Pl. 15.8, 15.9). Discussions were held with the local people regarding the legends and songs relating to plants.

A search was also conducted in the Central National Herbarium and the herbarium at Shillong for any uses of the plants recorded on herbarium sheets. The importance and advantage of such a study has already been explained by various scholars (Jain 1967, 1972; Reis, 1962; Schultes, 1962, 1960).

Similar search was made for plantlore of the Karbis in literature. Very scanty literature exists on this tribe. *The Mikirs*, by Edward Stack (1908) is the only publication dealing exclusively with their ethnolgy.

FOLKLORE

The influence of palnts in religious beliefs and customs becomes obvious through some of their songs and legends.

Tejhi or *Timur*—Plant name is mentioned in two songs, *Maurisa-kuhi* and *Karbi-kaplang*. The former is sung in a ritual for the dead, called *Chaumangkan*, which reads:

"Engli karbi lang-ta
Neaumka ki daukak
— — — —
— — — —

Lachi pirthe kim *Tejhi* araung
Acheng bang chijadi alam
Tarata thar-dak athat thar-dak
— — — —"

Whenever a Karbi is asked about the origin of their tribe, he tries to explain it through the song *Karbi-kaplang*. It reads as follows:

"Nichau mudang-lat marang
Karbi-pau ning-phi nang-plang
Achang pirdi thangbi-jang
— — — —
— — — —
Timur araung tim ham aklang
Karbi laung-chung ang tacham
— — — —"

In both these songs, it is explained that God created human beings under the *Tejhi* or *Timur* plant *(Garuga pinnata)*. They regard this species as sacred and with miraculous powers.

Rice *chauk* is the staple food of the Karbis. The following song is sung in their harvest festival *Chaukarauy:*

"Kuki-chin dai-pau pan Teraung Rang Charpau
Charnam Cha-pin-ta
Re kathe-rasau kalal chedau lang kula chidau
— — — —
— — — —
Hara-chan *Chauk* tipli tarilang
Kakan achan chal-nang"

This indicates that an old Karbi, Teraung Rang Charpau by name, came to know from a Kuki-chin fellow, of the existence of wild rice which can be used as food. This man told this to Diliram-Charpau, who collected wild rice and organised a feast and observed the *Chaukarauy* festival for the first time. This song is known as *Lakhmi-kaplang*.

The song implies on the one hand that the Mikirs were once food-gatherers and on the other that there is some relationship with the Kuki-chin tribe.

Rice beer is a favourite local drink. When somebody gets intoxicated, he sings a song called *Thap-kaplang* which reads:

"Changcharpau mahin
Ei parlim tang-ding
Jadi cham pliaur-din
Chum-chi dai ahin
— — — —"

It says that their God, Changcharpau (whom they regard as the God of creation) taught them how rice-beer cake could be prepared from leaves of a plant called *Marthu* (*Croton joufra*). This plant is sacred and the rice-beer prepared with the cake of this plant has divine qualities.

The shells of bottle-gourd, *Lagenaria siceraria*, are seen in every ceremony, festival and even day-to-day life. A legend regarding the origin of bottle-gourd says that once Changcharpau lost three of his teeth. He gave these teeth to his wife to bury. Ultimately one plant sprang out and gave rise to three fruits of characteristic size and shape, viz., *Langbaung*, *Baung-chin* and *Har-baung*. *Lang-baung* is used for bringing and storing water. *Baung-chin* is used to offer rice-beer to the Gods and *Har-baung* is used in marriage and other festive occasions.

FOLK LIFE

More than 350 plants are used by the Karbis for their sustenance. The influence of plants in their life can be studied under certain broad general headings, such as food, shelter and medicine, which are their main requirement for life and also plants used for tattooing and worship.

Food

Rice is the staple food of the Karbis. The method of cultivation is still by *jhuming* They also cultivate *Zea-mays* (*Thangtha*), *Coix lacryma-jobi (Tumdak)*, *Pennisetum americanum* (*Jamir*), etc., on a small scale as mixed crops in *jhum* fields. These food grains can hardly meet their demand for the whole year. Some wild plants, which are quite abundant in this region serve as subsidiary foods in scarcity. Except *Dioscorea*, the plants which are mentioned in Table 1 are less known for their use as food. Lhey collect fuel from nearby forests (Pl. 15.1).

Shelter

As mentioned above, the Karbi people are semi-nomadic in nature. Although nowadays they do tend to settle down, often they shift their settlements. As a rule they construct temporary structures for shelter with the plant materials available in their surroundings.

Characteristic Karbi houses are built on raised platforms (Pl. 15.7) a peculiar feature of tribal housing in northeastern India. Now some people build their houses on ground level also.

The major portion of the house, viz., roof, wall and platform, is built of bamboos. The most commonly used species are *Bambusa nutans* (*Chak*), *B. pallida* (*Chak-duk*), *B. tulda* (*Artungsau*) and *Neohouzeaua dallooa* (*Tarang*). Posts, rafters, pillars of platform, etc., are of such woods, as *Cassia fistula*. (*Haunaru-araung*, *Turmang*), *Dysoxylum binectariferum* (*Khrangkelaung-araung*) *D. dobara* (*Khrang*), *Gmelina arborea* (*Phangaraung*), *Melia azedarach* (*Hanthapi*), *Mesua ferrea* (*Phik-charne-araung*), etc.

The common thatching materials are the leaves of *Livistona jenkinsiana* (*Taukau-araung*) and *Imperata cylindrica* (*Phalang*). Occasionally leaves of *Calamus erectus* (*Pre* or *Tor*, a name applied to all canes), *C. latifolius*, *Daemonorops jenkinsianus* and *Phrynium pubinerve* (*Kau-arbau*) are also used.

The barks of *Sterculia villosa* (*Kaung-kelau*) and *Trema orientalis* (*Rampak*) are used as binding materials.

Medicine

The knowledge of medicinal uses of plants is well-developed among the Karbis. More than two hundred fifty plants are used by them for medicinal purposes. But the knowledge is confined chiefly to the medicinemen. However, a good number of these plants are also used in the Karbi household when the local medicineman is not available. Table 2 lists a number of plants employed in common ailments. These plants grow mostly near the villages and do not necessitate and complicated technique in applying them.

Tattooing

Tattooing of any part of the body is not popular either with men or women. Nevertheless, some women on attaining puberty are found to wear a tattoo mark in form of a perpendicular line on the forehead, nose, upper lip and chin. This is done with the leaf-juice of *Baphicanthus cusia* (*Bukangda*, *Bukangku*, *Sibu*). Colouring the teeth black is also common among the

Table 1. Some common species used for eating.

Botanical name	*Local name*	*Edible part/how prepared*
Actephila excelsa	*Mipri*	Leaves eaten as vegetable; seeds eaten fried
Alpinia malaccensis	*Tara*	Young shoots eaten roasted
Amorphophallus campanulatus	*Thamanai*	Tubers eaten roasted or boiled; leaves as vegetable
Angiopteris evecta (Plate 15)	*Chainau-aukimu*	Underground parts and base of rachis eaten after boiling and thorough washing
Antidesma diandrum	*Inchung*	Young leaves eaten as vegetable
Begonia roxburghii	*Chuat*	Leaves and petioles eaten as vegetable
Calamus tenuis	*Pre* or *Taur*	Young shoots eaten roasted
Cyclosorus aridus	*Dung-kak*	Young leaves eaten as vegetable
Dendrocalamus hamiltonii	*Kaiphau*	Young shoots eaten after boiling
Dioscorea arachnida	*Rui-sang*	Tubers eaten boiled
D. bulbifera	*Rui-pan*	Tubers and bulbils eaten boiled
D. glabra	*Rui-ding*	Eaten boiled
D. hamiltoni	*Rui-kaulang*	Eaten boiled
D. lepcharum	*Rui-ning*	Eaten boiled
D. puber	*Rui hen*	Eaten boiled
D. trinervis	*Rui-han-dang*	Tubers eaten boiled

Botanical name	*Local name*	*Edible part/how prepared*
D. wallichii	*Rui-nihang*	Tubers eaten after boiling and thorough washing
Eatostema platyphyllum	*Tang-nap*	Leaves eaten as vegetable
Entada phaseoloides	*Hamb-arikang*	Kenrel eaten after boiling and thorough washing
Ficus hirta	*Inghthum-therapau*	Young leaves and young fruits eaten cooked
Gnetum gnemon	*Hanthu*	Leaves eaten roasted; fruits eaten fried.
Lasia spinosa	*Chuchat*	Rhizome eaten after boiling and thorough washing
Maesa indica	*Naukling*	Shoots eaten as vegetable
Pouzolzia viminea	*Utkra*	Leaves and shoots eaten as vegetable
Premna latifolia	*Ang-kelauk-araung, Phe-phe-araung, Phla-phla*	Bark eaten fresh or cooked

Table 2. Some common species used in medicine

Botanical name	*Local name*	*Parts used and preparation*	*Disease and method of administration*
Aristolochia saccata	*Rikangbatelaung*	Underground part pounded and mixed with water	Given in stomach pain—oral
Baccaurea ramiflora	*Tampaiuk*	Fresh bark chewed or juice	Constipation—oral
Brucea mollis	*Kaunine*	Powder of dry fruits	Malarial fever—oral
Clausena excavata	*Thaungkuk*	Juice of leaves	Muscular pain—rubed on
Clerodendrum colebrookianum	*Hinchang*	Young leaves used as vegetables	Act as anthelmintic
Coffea benghalensis	*Mirherai*	Leaves infusion	Infants with fever—bath
Dalhousiea bracteata	*Laungy-aurgthu*	Leaves pounded into paste	Cuts—applied
Dracaena angustifolia	*Charlang*	Poultice of young leaves	Swelling of joints —applied
Dracaena petiolata	*Laungla*	Juice of roots	Stomach pain and vomiting—oral
Elatostema lineolatum	*Himbu*	Leaves pounded into paste	Cuts—applied
Euphorbia antiquorum	*Hiju-araung*	Latex	Burns—applied
Hedyotis scandens	*Hanik-tu*	Poultice of leaves	Boils—applied
Homalomena aromatica	*Aukha-tachang*	Rhizome	Influenza—inhalation
Hoya globulosa	*Mitha-nadai*	Leaf-ash	Dog bite—applied

Botanical name	*Local name*	*Parts used and preparation*	*Disease ond method of administration*
Hyptianthera stricta	*Mirherai*	Infusion or powder of dry leaves	Expectant mother —oral
Ixora acuminata	*Launga-pranpi-thecka*	Decoction of roots	Used as galactagoguc
Mikania cordata	*Nari*	Leaves and shoots used as vegetables	In stomach pain and in dysentery—oral
Musa velutina	*Lauraup*	Juice of pseudostem	Dysentery—oral and for bringing about clotting in bleeding wounds—applied
Olax acuminata	*Han-kang-yang*	Leaves used as vegetables	As cathartic
Ophiorrhiza ochroleuca	*Launga-mihik*	Juice of leaves	Headache—oral
Piper diffusum	*Aukang*	Juice of roots	Indigestion—oral
Saprosma ternatum	*Thabai* or *Thabaibanghi*	Salted juice of bark	Indigestion—oral
Solanum myriaanthum	*Charra*	Polutice of fruits	Toothache—applied
Xylosma longifolium	*Thengpi-kani*	Powder of dry bark	Stomach pain—oral

old people of both sexes. This is done with the gum exude after burning the green stems of *Croton caudatus (Kum-kum araung)*, *Lasianthus sikkimensis* (*Chauik-bata*), *Murraya paniculata (Dengjir-araung)* and *M. koenigii (Theng-sak-sau)*.

Worship

Karbis do believe in many Gods but they have no idols, temples or shrines. In fact, they believe in pantheism (Parampanthi, 1977; Terang, 1965). There is no worship of plant or animal, but they use a large number of plants in their worship and divination of diseases (Pl. 15. 6)

Castanopsia indica (Phaung-rang-araung), *Dracaena angustifolia (Charlang)*, *D. petiolata (Laungla)*, *Dendrocalamus hamiltonii (Kaiphau)*, *Floscopa scandens (Chahalular)*, *Phlogacanthus thyrsiflorus (Jak-an)*, *Piper attenuatum (Bithi)* and *Tabernaemontana divaricata (Mirharai)* are few of the plants which are used in various religious ceremonies.

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16

SOME PLANTS IN THE LIFE OF THE GAROS OF MEGHALAYA

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ABSTRACT

A large number of plants yield useful commodities or raw materials for mankind. The tribal people have much more association and knowledge of the plants and the Garos are no exception. Garo hills, the western part of Meghalaya in northeastern India, is inhabited by Garos who largely practise shifting cultivation. With very poor industrial development and communications but vast forest area, they have been utilising a large number of plants. A brief account of some such wild edible plants, plants in medical care, other miscellaneous uses and plants in their mystic and supernatural beliefs is presented.

Garo Hills, named after the inhabitants on this hilly terrain in the western part of Meghalaya, are situated between 25° 9′ and 26° 1′ N and 89° 47′ and 91° 2′E. The area covers about 8100 sq km and comprises two recently separated districts, viz , the East and West Garo Hills districts.

The area is mostly mountainous, with two principal mountain ranges, the Tura and Arbela ranges, running parallel in east-west direction, almost in the centre of the region. The highest point is the Nokrek peak, 1460 m, while most of the other hills range from 450 to 600 m. There are several rivers and rivulets traversing the region.

1. *Botanical Survey of India, Port Blair-744102.*
2. *Botanical Survey of India, Shillong-793003.*

The tribal population of these hills is referred to as the Garos by the people of the adjoining plains and also in literature although they call themselves *Achikrang* (people of the hills) or *Manderang* (men) (Pl. 16). They are segregated into several geographical communities called Abeng, Ateng, Matchi, Migam, Lyngngam, Chisk, Matjangchi and Awe (Chatterjee, 1968). They are believed to have migrated long ago from Tibet with rice seeds in search of an alternative abode and settled on these hills after roaming the plains of Assam (Baveja, 1961). Since then they had to have a culture of their own, thus forming an independent ethnic group, distinct from their neighbours, the Khasis. Their culture and psychic trends have been studied extensively by Dalton (1872), Playfair (1909) and Sinha (1966), wherein plants used by them have been casually mentioned.

The rich and thick forests on these hills and the lack of communication with civilisation have kept the people closer to nature whence they derive many of their basic needs. As any other tribal population, the Garos too have intimate association with, and knowledge of plants and their uses. It appears that although they had frequent contact with the people of plains in their weekly markets (which were their almanac in life) for selling their valuable crop, the cotton, in turn they gained very little from them.

Apart from the very common plants cultivated in their *jhum* lands such as hill-paddy, millet, maize, cotton, job's tears, brinjal, ginger, pumpkin, arum and tapioca, they have vastly exploited the natural forests in which they live.

The information obtained while studying the flora of the area and studied from the herbarium notes and literature of earlier collectors (Kanjilal *et al.*, 1934-40) is presented here. It is not claimed to be an exhaustive ethnobotanical account.

Firstly, mention should be made of the various bamboos, viz., *Dendrocalamus hamiltonii* (*Wanok*), *Pseudostachyum polymorphum* (*Wadroo*), *Gigantochloa macrostachya*, *Bambusa tulda*. (*Makal*), *B. vulgaris* (*Washuti*), *Melocanna baccifera* (*Wah-sith*, *Wah-thri*), utilised by them for constructing houses, making simple implements and weapons (*shelu*, *mellen*, etc.), containers for carrying water, cooking purposes, baskets (*kilta*) and umbrellas.

Food

The Garos know many wild edible plants and their uses. The following list gives their botanical names arranged alphabetically, along with the Garo names and the utility.

Alpinia nigra (*Gong*): Rhizome used as vegetable.

Antidesma diandrum (*Arobak, Dokumi*): Leaves and fruits used as vegetable.

Aphania rubra (*Dedakhi-theng*): Ripe fruits eaten.

Castanopsis tribuloides (*Sako*): Seeds eaten.

Chlorophytum arundinaceum (*Chamksa*): Leaves used as vegetable.

Clerodendrum serratum: Leaves used as vegetable.

Dendrocalamus hamiltonii (Wanok): A delicious food, called Me'A, is prepared from the tender shoots; the tender shoots cooked with dry fish.

Dillenia pentagyna (Agachi): Flower buds cooked with dry fish.

Eryngium foetidum (*Shamshai):* Plants cooked with vegetables for flavouring.

Garcinia paniculata (*Thisru*): Ripe fruits edible.

Gardenia campanulata (*Darichie, Rukhawak*): Leaves and fruits cooked.

Hodgsonia macrocarpa (*Kagoba, Thi-be*): Seeds washed, roasted and eaten.

Hovenia dulcis (Bol-phukrum): Peduncle of the fruit used as vegetable.

Lepisanthes rubiginosa (*Abigram*): Ripe fruits edible.

Meyna spinosa (*Thiksing, Chisking, Thitchkeong*): Fruits and young leaves eaten.

Microcos paniculata (*Gansari*): Fruits edible.

Musa: The inflorescence axis with sheaths dried and burnt; the

ash mixed with vegetable preparations in place of any oil.

Olax acuminata (*Bol-narang*): Leaves edible as vegetable.

Pterygota alata (*Boktha, Mi-bol*): Roasted seeds eaten.

Rubus rugosus (*Thekhi-sambak*): Fruits edible.

Saurauia punduana (*Bor-jir-sinning*): Ripe fruits edible.

S. roxburghii (*Gungsning*): Ripe fruits edible.

Sterculia villosa (*Udhara, Olmak*): Roasted seeds eaten.

Stixis suaveolens (*Maronchi*): Fruits edible.

Trigonostemon semperflorens: Fruits edible.

Medicine

Although nowadays patent allopathic medicines are sold in their weekly markets by quack-doctors, the Garos look for many wild plants for their medicinal use. Some of the important plants used for medicine are:

Artemisia nilagirica (*Khel-bijak*): Plant used in cure of asthma.

Casearia vareca: Fruits ground to paste and the extracted juice used as anthelmintic.

Cassia fistula (*Soneru*): Pulp of the fruit used as purgative.

C. tora: Leaves and seeds used as remedy for ringworm and skin diseases.

Clausena heptaphylla (*Muka-himpreth*): Leaf juice used for headache.

Croton joufra (*Mikret*): Bark used in veterinary diseases.

Ficus fistulosa (*Tabi*): Used for headache.

Garcinia cowa (*Denga-deti: Tekra*): Fruits sliced and preserved in water which is administered for stomach disorders.

Gouania tiliaefolia (*Dugithang, Dumigong*): Leaves soaked in water which is used for bathing patients to relieve spasmodic pain.

Hedyotis scandens (*Mikrisim*): Leaf juice used for eye diseases.

Melastoma malabathricum (*Kakkhi, Kakkuchi*): Leaf juice applied to heal cuts and wounds.

Mucuna prurita (*Wakmi*): Seeds eaten for increasing potency: hairs of seed coat administered as vermifuge.

M. bracteata: Same as *M. prurita*.

Nepenthes khasiana (*Miman-kuchi*): Pitcher with the juice and insects crushed and administered for cholera patients.

Paederia foetida (*Pashum*): A specific treatment for rheumatic diseases.

Pegia nitida (*Du-cheng-brup*): Juice of the plant used for dressing cuts and wounds.

Persea gamblei (*Ongtat*): Plant juice used for massaging muscles to alleviate pain.

Rauvolfia serpentina (*Dogrukmi, Somkibon*): This well-known medicinal herb is believed, by the local people, to posses properties to cure snakebite, insanity. Used to cure stomach troubles.

Rubus rugosus (*Thekhi-sambok*): Fruit juice used for curing fistula.

Sabia lanceolata (*Miri, Mandri*): Leaves used for fomenting swollen ankles and wrists.

Stauranthera umbrosa (*Sukum saplax*): Plant juice used for curing boils.

Stephania japonica (*Kharkha*): Juice of roots administered to heart patients.

Vitex peduncularis (*Rong-ngi, Rongri, Slangre*): Used for black-fever.

Zizyphus mauritiana (*Theng-khi*): Bark used for curing diarrhoea.

Fish poisons

In the area having two principal hill ranges of varying elevations with several rivers such as Simsang, Bugi, Damring, Gonal, Darang and many rivulets, the people engage in fishing. One of the methods adopted is by throwing a decoction of crushed and soaked plant parts into the stream. This stupefies the fish makes them float up, facilitating an easy catch. Plants used for such purpose are:

Acacia pennata (*Sirengkhi, Shitking, Remsu*): Bark is used.

Engelhardtia spicata (*Rubok, Rudek*): Bark is used.

Millettia pachycarpa (*Mak-khal, Monkal, Markar*): Roots are used.

Symplocos cochinchinensis subsp. *laurina* (*Malabol*): Fruits used.

Xeromphis spinosa: Fruits sliced and used.

Fibres

Coarse blankets (bedding) are prepared from bark fibres by beating and retting the bark of the following plants:

Artocarpus chama (*Charm*).

Ficus rumphii (*Prap*).

Kydia calycina (*Anisep*).

Oreocnide integrifolia: *Khilkila, Kilkra*. Also used for making fishing lines and nets.

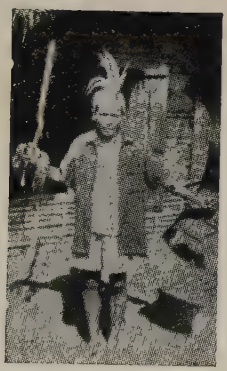
Oreocnide frutescens (*Pokram*): This is considered most suitable for blankets.

Pterygota alata (*Boktha, Mi-bol*).

Sterculia villosa (*Udhara, Olmak, Ubak*).

Dyes

It is recorded that the Garos do not engage themselves much in dyeing but a few plants are known to them for colouring, especially their baskets (*Kilta*) and cloth.



16 Nokma—a Garo village headman with traditional weapon, Assam

Flemingia stricta (*Samnaskhat*): Purple dye is obtained from the hairs of the pods.

Morinda angustifolia (*Chenong*): Yellow dye is obtained from the roots.

Mussaenda roxburghii (*Gardek*): Dye obtained from the leaves.

Miscellaneous

Asplenium (*Sarat*): Used in preparation of fermenting-medium (*Wanti*) for rice beer (*Chu*).

Careya arborea (*Gemble, Gembel*): Used for making the favourite ritual musical intrument, long drum (*Krum*) used in religious dances.

Choerospondias axillaris (*Aming-gok*: *Agimmok*): Bark used as a substitute for *Areca*.

Entada pursaetha (*Sue, Chuui, Shuri*): Seeds ground to a paste and used for washing hair. Children use seeds as marbles for playing.

Imperata cylindrica (*Ampang, Hanfang*): Used for thatching roof.

Lagenaria siceraria (*Bok, Pongsim, Fong*): The pericarp of the fruit used for carrying water and other drinks.

Licuala peltata: Leaves used for thatching and as umbrellas.

Mesua ferrea (*Karai, Khindi*): Oil extracted from the seeds for burning in lamps.

Solanum indicum (*Kimka*): Seeds used as one of the ingredients for making the fermenting medium for the drink *Chu*.

Xylosma longifolium (*Phul-wal*): Tender leaves used with opium.

Magico-religious beliefs

There are many plants which are believed to have mystic and supernatural powers. Some of them are mentioned here. A plant called *muni* is believed to exist in Balpakram, where all the dead (spirits) go and remain, and when smelt causes eternal sleep. But the existence of sueh a plant is doubtful.

Averrhoa carambola (*Amrenga*): The leaves are kept in houses to ward off measles.

Erythrina variegatu (Mandal): The wood is a must for burning a corpse. The wood of *Schima wallichii* (*boldek*), *Dillenia pentagyna* (*agachi*), *Bombax* (*simul*) are not used for this purpose as it is believed that they cause itching, bring bad luck or cause sorrow to the spirit.

Spatholobus parviflorus (*Mari*): This is dreaded as an evil-spirited plant of the forests.

Thysanolaena maxima (*Smu, Simu*): The grass is collected and kept under the bed to ward off bad dreams.

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17

A PRELIMINARY ETHNOBOTANICAL SURVEY IN KHASI AND JAINTIA HILLS, MEGHALAYA

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ABSTRACT

Over one hundred plants of ethnobotanical importance, used by the tribals of Khasi and Jaintia Hills for varied purposes like medicine, food, implements and musical instruments, religious ceremonies, etc. are discussed.

Flemingia vestita, Gynocadia odorata and *Houttuynia cordata* are some of the subsidiary fruit and vegetable plants. Wood of *Quercus dealbata* and *Camellia kissi* is used for making handles of agricultural implements, tools, etc. Among the indispensable plants for religious rituals and ceremonies are *Lagenariaa* and *Zingiber officinale*. The Khasis and Jaintias have indigenous musical instruments, not met with among other tribals. There is a four-stringed instrument known as Duitara, made from the wood of Araliaceous trees and young Pinewood (*Pinus kesiya*). The second interesting instrument is like a xylophone, called Singphong, made from many pieces of split reeds.

The Khasi and Jaintia Hills districts, in the state of Meghalaya, are situated approximately between 90° 40′-92°50′E and 25°-26° 10′N. Meghalaya is the abode of three distinct major tribes, viz., the Khasis, Jaintias and Garos. A preliminary account of the ethnobotany of the former two tribes is given in this paper.

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Plants are more intimately connected with the life of the local tribals in these hills than, perhaps, anywhere else in India. For instance, the preservation of climax vegetations or virgin forests, known as *Lawkyntang* (Sacred Forest) on religious grounds is in vogue in the Khasi and Jaintia Hills. Both tribes are very efficient carpenters and as such, their knowledge of the qualities of various forest timbers is remarkable. Bamboo is closely woven into the life and culture of the villagers in these hills. Tribals living at lower altitudes and warmer climates invariably construct their huts from bamboos like *Bambusa tulda* (*Shkong*), *B. pallida* (*Shken*), *B. vulgaris*, *Dendrocalamus hamiltonii* (*Sejlai*), *Melocanna baccifera* (*Sli*). A very common bamboo used for walling rural huts and even urban cottage is *Chimonobambusa khasiana* (*Namlang*), which holds the plaster in place. Rural tribals employ an assortment of bamboo baskets and carriers in which they carry their field and farm products to the market. These are of diverse shapes and sizes and are woven from bamboos like *Arundinaria callosa* (*Spar*), *Bambusa pallida*, *B. vulgaris*, *Cephalostachyum capitatum*, *Melocanna baccifera* and *Oxytenanthera macrostachya*.

These tribals, especially the villagers, are predominantly cultivators. They have an assortment of indigenous implements, the handles of which are made from the wood of *Quercus dealbata* (*Dieng-Sai*), *C. caudata* (*Dieng-Tyrnem-Synrang*), *C. kissi* (*Dieng-Tyrnem-Bhoi*), *Docynia indica* (*Dieng-Soh-Phoh*) and *Schima wallichii* (*Dieng-Ngan*); these timbers are light but strong.

Husking of paddy is done by manual pounding in a wooden mortar called *Thlong*, with a wooden pestle called *Synrei*. The mortar is approximately 45 to 60 cm in diameter and of approximately the same depth, made from the wood of *Schima wallichii* while the pestle is 1.2 to 1.4 m tall, about 10 cm in diameter, made usually from the wood of *Quercus dealbata*, *Docynia indica* and *Pyrus pashia* (*Dieng-Soh-Shur*). Winnowing is done with the help of a disc-shaped *Prah* or *Shalani* of 45 to 60 cm diameter, woven from *Phragmites karka* and *Chimonobambusa khasiana*.

As is true with other tribals and aborigines, the Khasis and Jaintias also eat several wild fruits and vegetables, which are of twin value as food and medicine. It is often remarked that a

native stranded in the jungle will never die of starvation, as he is able to sustain himself on numerous wild fruits, roots, tubers and vegetables. Plants which appear repulsive to city dwellers are relished by the rural folks. Such little-known plants can be seen on market days in remote villages. A list of these plants is given in the appendix.

Mention may also be made of the *Tungrymbai*, a typical chutney,of these tribals, which has a rather repulsive odour, but, nevertheless, a very delicious taste. It is made from soybeans by boiling them over fire kindled from angiospermous trees (though, otherwise, pines are the common firewood of the region). The beans are then tightly wrapped in leaves, kept in a bamboo basket and placed on the *Tyngier*, a horizontal platform suspended over the hearth in the kitchen. It is kept in this position for three to four days after which it is removed, pounded into a fine paste, sold in the market and may be taken raw or cooked in diverse ways with different ingredients. This chutney is reputed to have qualities of promoting digestion and is an indispensable item in feasts.

Although venomous snakes and other poisonous insects are not ubiquitous as in the plains, there are a few herbs which are popular as antidotes to snakebites and stings of poisonous insects. These are *Acorus calamus*, *Ageratum conyzoides*, *Alysicarpus monilifer*, *Centratherа grandiflora*, *Drymaria cordata*, *Galinsogap arviflora*, *Imperata cylindrica*, *Justicia procumbens*, *Leucas lavandulaefolia*, *Oxalis corniculata*, *Polygonum capitatum*, *Rubia cordifolia*, *Scutellaria discolor* and *Solanum torvum*.

These tribals, especially the less-educated, seldom go for allopathic treatment even in cases of serious accidents and compound fractures. They rely exclusively on their own herbal medicines and massages by specialists. Such treatment is also resorted in cases of body ailments. The effectiveness of these herbal cures can be measured by their popularity among the highly educated tribals and even non-tribals. Sometimes even allopathic doctors resort to tribal treatments especially in cases of bone fractures. *Adiantum philippense*, *Crinum pratense* and *Pouzolzia bennettiana* are a few of the plants used in these treatments.

As mentioned earlier, the Khasis and Jaintias are basically tillers of land and hewers of wood and thus, have to handle

numerous tools and implements for their daily work. Consequently, minor mishaps, resulting in cuts and wounds are unavoidale. Plants used for such fresh cuts and injuries are quite common: *Ageratum conyzoides*, *Elsholtzia blanda*, *Eupatorium adenophorum*, *E. odoratum* and *Ophiopogon intermedius*.

The only carnivorous pitcher plant in India, viz., *Nepenthes khasiana* is found in these hills. It is popularly called the *Pitcher Plant*. The trap or pitcher which is the modified part of the leaf, measuring up to sometimes 20×4 cm, contains a digestive juice which is used as a remedy for stomach disorders and also for eye sores. *Adhatoda zeylanicai Calotropis*, *gigantea*, *Dioscorea* spp., and *Solanum* spp., are some of the plants which are used as oral contraceptives or as abortifacients.

A national sport of the Khasis and Jaintias is archery. They are very efficient marksmen. The bow and arrow formed their main weapon in olden days. The bow is usually made from *Bambusa tulda* and *Dendrocalamus hamiltonii*, while the bow string is of plant fibre or bamboo strips. Arrows are made from *Bambusa khasiana* and *Chimonobambusa khasiana*, with arrowheads of two types—one plain, the other with a sagitate base. Another peculiar weapon is the *Tiehbatur* which combines the principles of the bow and the catapult; this also is made from bamboo materials.

Another important sport, hobby and avocation of these tribals is fishing by angling. Fishing rods are made from *Phyllostachys mannii* and *Bambusa pallida* and the line is of resined fibre. Popular baits are fruits of *Viburnum foetidum* (*Soh-lang*), *Lantana camara* (*Soh-pang-khlieh*), *Castanopsis india* (*Soh-ot*), leaves of *Crassocephalum crepidiodes* and tubers of *Ipomoea batatas* (*Phankaro*), although flour paste and worms are also used. In brooks and streamlets, fish are caught in baskets traps called *Shrips*, woven from bamboos into diverse shapes and sizes. The basic principle on which they function, lies in their funnel-shaped mouth which allows the fish to enter but not to escape. The third and most effective means of hauling a great number of fish is by the use of fish poisons which are prepared from plants and which intoxicate or kill the fish. Fish poisoning is done with the roots of *Millettia pachycarpa* (*Khariew*), fruits of *Zanthoxylum acanthopodium* (*Jaiur*), bark of *Myrica esculenta* (*Soh-lia*) and *Schima wallichii* (*Dieng-ngam*)

and plants of *Polygonum hydropiper*. These, individually, are beaten upstream on a boulder and the juice is allowed to mix with the water; when the groggy fish struggle to the surface and float, they are caught in the baskets. (Pl. 17.1).

The Khasis and Jaintias are endowed with inherent musical taste. Since time immemorial, this land has been a land of dance and song and the hills ring and re-echo the dance music of pipes and drums. But, of late, westernised music has not only made its influence, but appears to have come to stay. However, thanks to the All India Radio, a good deal of interest has been created for the encouragement and revival of traditional music. As a result, local artists frequently perform with these indigenous musical instruments on radio programmes with flowless rhythm and perfect harmony.

The *Tangmuri* is a clarionet-like instrument; the pipe-like middle body is made from the wood of *Viburnum foetidum* and the small blowing piece is of reeds and is inserted into the blowing end. The use of the *Tangmuri* and drums is invariably woven with the fabric of cultural and social life of these people, be it festive or mourning. When these instruments are used for community dances, the music produced is really very exciting and vigorously rhythmic.

The *Besli*, a home-made bamboo flute and the *Sharati*, a reed flute, are used in expressing the intricate Khasi-Jaintia melody. The *Sharati*, in particular, plays quite a prominent role in the religious music, invoking the spirit of the dead.

One of the most popular forms of vocal music is the story-song in which the instrument known as the *Duitara* is an essential accompaniment. This is a typical instrument of the tribals. It is four-stringed, made from the wood of *Aralia montana* (*Dieng-la-tymphu*), *Brassaiopsis glomerulata* (*Dieng-la-tymphu*), *Heptapleurum hypoleucum* (*Dieng-la-kor*), *Erythrina arborescens* (*Dieng-song*) and also from the young trunks of *Pinus kesiya* (*Dieng-kseh*). It is played with a wooden plectrum and is used as an accompaniment and rarely as a solo instrument. It is not used in ceremonial music. Its neck which is longer than the rest of the main body, has, at its end, four holes in which wooden pegs are fixed to hold the strings in tune, as in the violin.

There are two sizes of the two-sided drums, one larger than

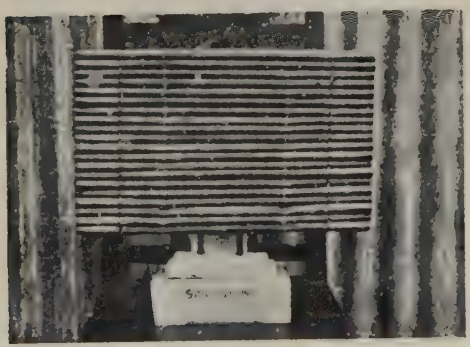
the other. The wood used for both drums is that of *Artocarpus integrifolia (Dieng-soh-phan)*. The right end is slightly broader than the left and is covered by cowhide. In the case of the bigger 'male drum' (*Ksing-shynrang*), the right end is played with a short drumstick made from the wood of *Quercus dealbata* (*Dieng-sai*), while the left end is covered with goathide and is played by hand. In the smaller 'female drum' (*Ksing-kynthei*), both sides are played by hand. Again, there are two sizes of one-sided drum, one much larger than the other. Here, again, the wood used in making these drums is also *Artocarpus integrifolia*. The bigger, known as the *Nakra* or *Bom*, is covered by cowhide and played by means of twin drumsticks made from the wood of *Quercus dealbala*. It is either hung on the shoulders or wheeled on a cart. The smaller drum known as the *Padioh* is manipulated with both hands or played with two small drumsticks of bamboo. The parchment is of goathide and stretching is effected by inserting wooden pegs.

Another interesting instument is the reed 'xylophone' known as *Singphong* which is made from many pieces of *Saccharum bengalense* (*Sder*). It is unusual and peculiar as it is not seen among other tribals. Being easily portable, it is frequently carried by the villagers to the fields where they play it during relaxation. It is also used as a substitute drum and employed at home to coach young children in traditional dances. (Pl. 17.2).

Since the advent of Christianity to these hills, the non-Christian-tribal religious and customs are gradually fading out. However, there are people still with traditional beliefs, who practise diverse religious rites and ceremonial sacrifices. During such religious ceremonies, amongst a host of other sacrificial articles, the *Klong—Lagenaria siceraria*, *Kiad* (Rice-beer), *Khaw* (Rice grains) and *Lakait* (Banana leaves) are indispensable items. Other plants employed in such ceremonies are *Garcinia anomala*, *Phragmites karha*, *Saurauja punduana* and *Zingiber officinale*. A tree considered sacred by these tribals is the Khasi Oak—*Castanopsis tribuloides* var. *ferox* (*Dieng-sning*).

The Khasi and Jaintia Hills are situated in the region which receives the highest rainfall in the world, earning the reputation of being the "wettest place in the world". During the monsoons, heavy downpours cause the rivers to flow above the

17.1 Fishing tools of the tribals of Megbalaya.



17.2 A musical instrument—Singphong in Meghalaya.

danger mark. Consequently, every year, there are a number of deaths due to drowning. The drowned bodies are detected and recovered with the help of the *Klong—Lagenaria siceraria*. After rigorous religious rituals performed by the priest, the *Klong* is allowed to float downstream on the concerned river. According to the belief, if the ritual of the priest is potent and strong enough, the *Klong*, instead of continuing downstream, will keep on whirling round over the place of the drowned body, after which expert swimmers dive below to recover the corpse.

The local rice, especially the red variety, is most commonly used in the preparation of *Kiad*, a local alcoholic drink. Where rice is scarce, millets like *Eleusine coracana*, *Echinochloa colonum*, *Panicum miliaceum* and *Setaria italica* are used. In places where it is abundantly available, tapioca (*Manihot esculenta*) is also used. The brewing of the drink is done by boiling the rice till it turns soft and straining it through a clean piece of cloth till the water drains off. The residue is now kept in a bamboo basket overlaid with some leaves and kept on a horizontal platform called *Tyngier*, suspended over the hearth in the kitchen. A lump of yeast or fermentor called *Thiat* is also added to the residue in the basket. It is kept this way for about three days to allow the process of first fermentation to occur. At the end of the third day, the residue is taken out from the basket and transferred to an earthen pot, specially made for the purpose. It is allowed to remain in this pot for another two days for the process of fermentation, converting it into a paste of required consistency. When it is ready for use, the required amount of the paste is taken out and the liquor is drained through a cloth filter. This is the rice beer which is used in the local religious ceremonies and other occasions, while the residue, known as *Jyndem* or *Jarut* is fed to the pigs. However, when the paste is diluted with a suitable volume of water and distilled, the refined local alcohol of commerce is obtained.

A constant companion of the manual labourer in this region is the pipe used for smoking tobacco. Though occasionally made from bamboo, popular woods used for making these pipes are *Litchi chinensis* (*Dieng-soh-manir*), *Rhododendron arboreum* (*Dieng-tiew-saw*), and *Xeromphis spinosa*.

But for very few exceptions, all these tribals, young or old chew Kwai—the famous khasi pān which comprises the *Areca catechu* nut, *Piper betel* leaf and a bit of slaked lime. It is considered to be a weak narcotic and often causes swooning and profuse sweating, especially to persons taking it for the first time. Pan chewing helps in warming up the body during the cold winter months.

Thus, it can be seen that this region is very rich in ethnobotanical information.

APPENDIX

Fruits

1. *Averrhoa carambola*	(*Soh-pyrshong*)
2. *Baccaurea ramiflora*	(*Soh-ramdieng*)
3. *Calamus erectus*	(*Soh-thri*)
4. *Castanopsis indica*	(*Soh-ot*)
5. *Citrus aurantifolia*	(*Soh-myndong*)
6. *C. limetta*	(*Soh-nairiang*)
7. *Elaeagnus conferta*	(*Soh-shang*)
8. *Eriosema chinense*	(*Soh-pen*)
9. *Flemingia vestita*	(*Soh-phlang*)
10. *Gynocardia odorata*	(*Soh-liang*)
11. *Litchi chinensis*	(*Soh-manir*)
12. *Myrica esculenta*	(*Soh-phie*)
13. *Prunus nepalensis*	(*Soh-iong*)
14. *Pyrus communis*	(*Soh-phoh*)
15. *Pyrus pashia*	(*Soh-shur*)
16. *Rubus ellipticus*	(*Soh-pero*)
17. *Rubus niveus*	(*Soh-khawiong*)
18. *Rubus rugosus*	(*Soh-nepbah*)
19. *Viburnum foetidum*	(*Soh-lang*)
20. *Zizyphus mauritiana*	(*Soh-broi*)

Vegetables

1. *Allium tuberosum*	(*Jyllang*)
2. *Eryngium foetidum*	(*Dhonia-khlaw*)
3. *Fagopyrum cymosum*	(*Jarain*)
4. *Gomphogyne-cissiformis*	(*Soh-thliem*)
5. *Houttuynia cordata*	(*Jamyrdoh*)

6. *Lactuca gracilis* (*Khmutsim*)
7. *Polygonum alatum* (*Jaut*)
8. *Polygonum chinense* (*Jallynnoh*)
9. *Sonchus asper* (*Jalynniar*)
10. *Zanthoxylum acanthopodium* (*Jaiur*)

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18

FOLKLORE MEDICO-BOTANY OF RURAL KHASI AND JAINTIA TRIBES IN MEGHALAYA

P. Kharkongor[1] and J. Joseph[2,3]

ABSTRACT

This article deals with 100 species of plants in 81 genera and 46 families, having medicinal virtues and which are commonly used, especially, by the rural tribals of Khasi and Jaintia hills.

The data presented in this article has been collected by personal contact with the local people and native practitioners. Reticence in divulging the identity of plants of traditional reputation was noticed.

Introduction

Meghalaya has three major tribes, viz., the Khasis, Jaintias, and Garos. The first two tribes occupy the Khasi and Jaintia Hills districts which lie, approximately, between 90°40′ 92° 50′E and 25°26°10′N. An account of the indigenous medicines used by these tribals for their common ailments and diseases is presented in this article.

In spite of the influx of modern civilisation and missionary activities to provide modern medical facilities, the rural folks to a great extent and a determined minority among the literate, hold on to their traditional faith in benefits of indigenous medicines.

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This is the first work of its kind on plants of the area with medicinal virtues, with their mode of preparation and administration. The data presented in this article has been collected by personal contact with the local people and practitioners, with great difficulty because of their reticence in divulging the identity of plants of traditional reputation. The authors do not claim to have obtained all the knowledge and *modus operandi* of preparation and application.

The knowledge of medicinal efficacy of certain plants is lost to posterity, because the possessor of the knowledge does not divulge it to retain his professional supremacy, and not because of any taboo that the medicinal potency will be weakened or nullified. Such secrets can be obtained only by close contact and with sufficient fortitude.

There is a belief that the effect of the herbs is enhanced by chanting mantras and incantations. At any rate, such rituals do increase the power of positive thinking both in the patient and the practitioner. Thus the faith of the patients is boosted up and the healing effect of the medicine is enhanced.

The present article aims at the preservation and perpetuation of this knowledge for the benefit of the mankind.

Enumeration

In the list that follows, the botanical name of the medicinal plant is given first, followed, wherever possible, by vernacular names, the locality (loc) of collection and uses. For ready reference, the names are arranged alphabetically.

(1) *Acorus calamus*

Bet—loc. Mawmluh: the juice of the roots is taken for relief from malaria;

Krah-phlang-phiang—loc. Sohkha: during headache and giddiness, roots are boiled and solution taken: paste of pounded roots is applied as a cure for snakebites;

Betse—loc. Mawtyrchiah: the mixture of roots and some animal bone is powdered and sprinkled on the patient who is trapped in witchcraft and devilry.

(2) *Ageratum conyzoides*

Loc. Sohkha: during typhoid fever and high body temperature, a paste made from leaves, ginger and mustard seed is

placed on skull, over the position of the brain, to bring down the temperature of the patient;

Loc. Mawmluh: whole plant is pounded, boiled and the solution is used in massaging body swelling, tumours, etc.;

Myngai—loc. Mawtyrchiah: leaves together with the leaves of *Galinsoga parviflora*, *Drymaria cordata*, *Bidens biternata* and ginger, are made into a paste and applied as a remedy for snakebites.

(3) *Alysicarpus monilifer*

Loc. Sohkha: the whole plant, made into a paste with ginger and mustard oil is used as an antidote to snakebites.

(4) *Amomum aromaticum*

Loc. Lailad: during nausea and vomiting, rhizome is mashed, the paste stirred in hot water and taken.

(5) *Anaphalis adnata*

Chkor-blang—loc. Jarain: a mixture of leaves and lime, made into a paste, is applied to cure haematoma.

(6) *Antidesma thwaitesianum*

Loc. Lailad: patients suffering from pain in joints are bathed with the solution of boiled leaves.

(7) *Aristolochia saccata*

Krah-lahit—loc. Nongtalang: tubers boiled with salt are taken during stomach ailments; in spleen and urinary troubles, the tubers are boiled with *Phitkiri* (alum) and taken;

Loc. Sohkha: for haematoma, the tubers are ground into a paste and applied; juice is also taken.

(8) *Aristolochia tagala*

Krah-kshiang—loc. Sohkha: rheumatic area is massaged with the paste of the roots or fruits; the root paste is also applied for toothache; leaves and roots are an important medicine for stomach ache, snakebite and fits.

(9) *Azadirachta indica*

Neem—loc. Byrnihat: for diarrhoea and dysentery, leaves along with barks of *Aegle marmelos*, *Shorea robusta* and leaves of *Phlogacanthus thyrsiflorus* are mixed together with a few more plants, boiled, stored in a bottle and taken when attacked with the disease.

(10) *Begonia palmata*

Loc. Mawmluh: when a person is allergic to vaccination, the whole plant is made into a paste and applied around the areas of vaccination.

(11) *Begonia roxburghii*

Kamchal—Loc. Lailad: the tubers together with the fruits of *Solena heterophylla* are boiled and the solution taken to relieve fever and body temperature.

(12) *Begonia rubro-venia*

Loc. Mawmluh: juice of roots is taken as a cure for dysentery;

Loc. Tyrna: whole plant is an ingredient of a mixture of nine plants which are boiled and taken during diarrhoea, dysentery and many other diseases.

(13) *Bidens biternata*

See (2).

(14) *Biophytum sensitivum*

Loc. Lailad: the leaves together with leaves of *Callicarpa arborea*, *Casearia vareca* and *Phyllanthus clarkei* are made into a paste and applied on forehead of the patient suffering from headache, giddiness and fever.

(15) *Boehmeria platyphylla*

Loc. Mawmluh: boiled leaves and stem are taken for dysentery.

(16) *Bonnaya reptans*

Krah-thang-shyndat—loc. Sohkha: juice of the leaves is taken with fresh raw milk to cure urinary ailments.

(17) *Callicarpa arborea*

See (14).

(18) *Callicarpa psilocalyx*

Loc. Lailad: in cases of fever, leaves along with those of *Pouzolzia viminea* and *Vitis lanceolaria* are made into a paste and applied on forehead.

(19) *Casearia vareca*

See (14).

(20) *Centella asiatica*

Bat-maina—loc. Mawmluh: whole plant mixed with *Drymaria cordata* and *Oxalis corniculata*, is boiled and taken to cure dysentery;

Loc. Sohkha: plant mashed into a paste is applied on boils and tumours;

Loc. Kudeng: syrup resulting from boiling of the leaves with small ginger and black pepper is taken as a cough syrup.

(21) *Centrathera grandiflora*

Loc. Mawmluh: the plants, wrapped in *Phrynium* leaves, burnt and made into a paste with slaked lime, are applied on insect stings.

(22) *Cinnamomum tamala*

Lapynriang—loc. Sohkha: bark is boiled and taken for cough.

(23) *Cinnamomum zeylanicum*

Dalshini—loc. Kudeng: leaves boiled and taken for cough.

(24) *Clerodendrum colebrookianum*

Jarem—loc. Jarain: leaves warmed over fire, mashed into a paste and massaged on rheumatism.

(25) *Clerodendrum nutans*

Loc. Kudeng: leaves pounded with slaked lime and applied on infections of skin.

(26) *Coelogyne stricta*

Bos—loc. Lailad: pseudobulbs along with roots of *Holmskioldia sanguinea* and *Zingiber rubens* are mixed, mashed and applied on forehead to relieve headache and fever.

(27) *Commelina paludosa*

Patugia—loc. Kudeng: whole plant ground with ginger and tobacco leaves applied on insect stings.

(28) *Croton tiglium*

Chicoc—loc. Iooksi: solution of bark or seeds in water for used as a laxative and stomach ailments; it is also used as a fish poison.

(29) *Cuscuta reflexa*

Man—loc. Mawmluh: this, in mixture with three other plants,

is made into a paste and used as a balm in body-ache and rheumatism.

(30) *Disporum pullum*

Chatri—loc. Mawtyrchiah: the stem portion is taken raw or cooked for rheumatism.

(31) *Drymaria cordata*

Pdeat—loc. Kudeng: whole plant with seeds of *Sohquit* is mashed into a paste and the diluted solution is taken as a remedy for vomiting and diarrhoea;

Soh-byrthit-eit-blang—loc. Mawmluh: whole plant with *Centella asiatica*, *Oxalis corniculata* and *Spilanthes* spp. is boiled and taken to cure dysentery;

Thei-thei (Mawtyrchiah)—See (2).

(32) *Drymaria villosa*

Loc. Sohkha: whole plant is mashed and taken in cases of food poisoning.

(33) *Elephantopus scaber*

Loc. Nongtalang: roots pounded, made into a solution and taken for urinary troubles.

(34) *Elsholtzia blanda*

Loc. Mawmluh: paste of plant applied on cuts and wounds;

Loc. Jongksha: flowers made into a paste, applied on rashes and skin diseases.

(35) *Elsholtzia pilosa*

Loc. Jongksha: leaves with the flowers of *E. blanda* pounded and applied on skin diseases.

(36) *Emblica officinalis*

Samyrlain—loc. Iooksi: fruits are mashed, strained and the juice is administered as an eyedrop for eye troubles.

(37) *Entada pursaetha*

Noap—loc. Mawmluh: a preparaion from the juice of the pounded pods used for washing hair and claimed to remove dandruff.

(38) *Eupatorium adenophorum*

Langsoo—loc. Jarain: leaves boiled and taken to cure severe

stomach aches; for cuts and injuries, the apical leaves are made into a paste with slaked lime and applied on the cuts; this stops bleeding and the leaves fall off only after the skin heals.

(39) *Eupatorium odoratum*

Krah-lynroh—loc. Dawki: leaves with those of *Labakor*, *Lahit*, *Jarem* and *Marbut* boiled and taken as a remedy for dysentery;

Loc. Lailad: young leaves made into a paste applied on cuts and wounds.

(40) *Eusteralis stellata*

Loc. Jarain: leaves are warmed over fire, powdered and applied with coconut oil on rashes and skin infections.

(41) *Galinsoga parviflora*

See (2).

(42) *Gleichenia linearis*

Loc. Mawmluh: whole plant boiled and victims of fits and epilepsy are bathed with the solution.

(43) *Gomphostemma parviflora*

Loc. Lailad: leaves made into a paste and applied on forehead, relieve headaches.

(44) *Hedyotis verticillata*

Loc. Lailad: during fever, patient's body massaged with leaf-paste to reduce body temperature.

(45) *Hedyotis uncinella*

Loc. Jongksha: leaves ground into a paste with tobacco leaves applied on diseases of the skin;

Lanai—loc. Raliang: juice of roots taken as a cough syrup.

(46) *Holmskioldia sanguinea*

Loc. Lailad: juice of roots taken to relieve fever;

Meshagul—loc. Lailad: See (26).

(47) *Imperata cylindrica*

Traw—loc. Nongstoin: when a person is bitten by a snake, the leaves and stem are formed into a twine and bound on both sides of the wound so as to prevent the poison from spreading.

(48) *Justicia procumbens*

Loc. Sohkha: leaves are an ingredient for the preparation

of a medicine used in curing insect stings of a serious nature.

(49) *Leucas lavandulifolia*

The juice of the whole plant, mixed with the juice of *Rubia cordifolia* and *Nicotiana tabacum*, in the ratio of 60 : 25 : 15, applied on snakebites and caterpillar stings.

(50) *Lindernia anagallis*

Loc. Lailad: leaf-paste applied on forehead to relieve throbbing headaches.

(51) *Mahonia acanthifolia*

Niangmat—loc. Nongstoin: juice of bark and wood used as an eye-drop for eye rash or moles.

(52) *Mimosa pudica*

Loc. Kudeng: maggots present in sheep and cattle are got rid of by feeding the infected animals with the leaves of this plant.

(53) *Moghania macrophylla Flemingia macrophylla*

Charaiaw—loc. Raliang: root-paste is used as a balm for body aches and muscular pains.

(54) *Mussaenda frondosa*

Chyrmew-kynthom-blang—loc. Sohkha: paste of leaves applied to ease body swellings.

(55) *Nepenthes khasiana*

Tymmoh-phare—loc. Jarain: juice of the unopened pitchers mixed with rice beer, taken to ease and release urinary traubles and blakages: juice also reported to cure stomach disorders and eye sores.

(56) *Nicotiana tabacum*

See (50).

(57) *Ophiopogon intermedius*

Loc. Mihmyntdu: fruits are taken in rheumatism and paste applied on injuries.

(58) *Oreocnide integrifolia*

Loc. Sohkha: roots, mashed with ginger, taken to cure rashes and skin infections.

(59) *Osbeckia capitata*

Loc. Jongksha: to rid maggots from cattle and sheep, the infected animals are fed with the pounded leaves.

(60) *Osbeckia stellata*

Loc. Jongksha: roots, mixed with dried fruits of *Brucea javanica* and roots of *Rubus ellipticus*, are made into a paste; water is added and the mixture is taken for dysentery.

(61) *Oxalis corniculata*

Katkai—loc. Mawmluh: See (20).

Krah-thabariaeishi—loc. Sohkha: whole plant along with *Krah-bsein* and ginger made into a paste and applied on snake-bites;

Soh-dkhiew—loc. Nongtalang: during dysentery, the whole plant is taken raw or cooked; the leaf-juice taken along with honey claimed to cure chronic cough.

(62) *Pavetta indica*

Loc. Iooksi: fruits, cooked with other vegetables are taken as curry and act as an anthelmintic for roundworm in children.

(63) *Peliosanthes teta*

Loc. Lailad: during fever, the mashed tubers taken with cold water aid in bringing low body temperature back to normal.

(64) *Phlogacanthus thyrsiflorus*

Jabuit—loc Mawmluh: during fever, the stem and leaves, mixed with whole plant of *Soh-krismas*, stem, leaves, and fruits of *Soh-mrit*, and stem, leaves of *Medilong*, are boiled and taken to bring down body temperature; also used in curing dysentery;

Nokam—loc. Byrnihat: See (9).

(65) *Phyllanthus clarkei*

Loc. Lailad: See (14).

(66) *Pholidota imbricata*

Loc. Lailad: pseudobulbs are crushed, dissolved in water and the solution taken for navel pains.

(67) *Piper betel*

Pathi—loc Sohkha: leaf-juice is used as an eyedrop for

optic troubles; the juice is also employed as an indelible ink for marking and labelling garments.

(68) *Piper mullesua*

Loc. Mawmluh: leaves and fruits, mixed with pepper and honey taken during cough.

(69) *Plectranthus lophanthoides*

Loc. Jongksha: leaves are made into a paste and applied on corns.

(70) *Polygala persicariaefolia*

Sherita—loc. Iooksi: whole plant boiled and taken to cure malaria.

(71) *Polygonum capitatum*

Loc. Mawmluh: whole plant crushed into a paste and applied on insect stings.

(72) *Polygonum hydropiper*

Loc. Sohkha: leaves are mashed into a paste and applied on skin diseases.

(73) *Pouzolzia viminea*

Loc. Lailad: See (18); in addition, the stem when soaked and dried is made into a good twine.

(74) *Rauvolfia serpentina*

Loc. Iooksi: during fever, root juice taken raw or boiled to bring down body temperature.

(75) *Rhus javanica-Brucea javanica*

Sama—loc. Iooksi: for stomach ache and gastric trouble; fruits crushed, fermented for a long time and fermented juice taken;

Soh-ma—loc. Nongstoin: fruits are taken raw as a cure for stomach disorders.

(76) *Rhus succedenea* var. *acuminata*

Dien-kain—loc. Jarain: when a rash or skin infection is caused by this tree, the leaves are slowly smoke-dried and the rash is said to vanish with the death of leaves.

(77) *Ricinus communis*

Loc. Mawmluh: leaf-paste used for massaging persons suffering from rheumatism and body swellings.

(78) *Rubia cordifolia*

Krash-sia—loc. Jarain: for all types of stomach ailments, stem and roots boiled and taken;

Saphrang—loc. Raliang: roots taken raw or boiled to cure stomach aches.

(79) *Rubus ellipticus*

See (60).

(80) *Rubus rugosus*

Loc. Lailad: fruits, mixed with leaves of two other plants, applied on body swellings.

(81) *Sarcandra glabra*

Soh-krismas—loc. Mawmluh: whole plant when boiled and taken said to cure blood deficiency; also see (64);

Loc. Jarain: crushed roots, boiled and taken, bring down body temperature of children during fever;

Loc. Iooksi: whole plant boiled and the water used for bathing paralytic patients.

(82) *Schima wallichii*

Dieng-ngan—loc. Mawmluh: leaves, especially the young ones, boiled and taken to cure flatulence.

(83) *Scoparia dulcis*

Loc. Sohkha: for eyesores, leaves, mixed with *Drymaria cordata* and salt, are mashed and applied.

(84) *Scutellaria discolor*

Ioli—loc. Raliang: to cure vomiting and nausea, the roots and leaves are crushed, diluted with water and taken;

Loc. Sohkha: for flatulence, constipation and indigestion, the leaves are boiled and taken;

Loc. Jongksha: leaf-paste applied on skin infections;

Loc. Mawmluh: whole plant is an ingredient for medicines used in curing diverse diseases;

Loc. Nongtalang: leaves, with roots of another plant, when ground and applied, act as antidote to snakebite.

(85) *Shorea robusta*

See (9).

(86) *Solanum myriacanthum*

Soh-shynreh—loc. Nongstoin: for toothaches, fruit is pierced

with a twig, heated over fire and the vapour allowed to circulate in the buccal cavity and to work on the infected tooth.

(87) *Solanum torvum*

Samynthoo—loc. Iooksi: leaf-paste applied on the wound inflicted by a black snake;

Loc. Sohkha: for toothaches, dried fruits burnt with musturd oil on a spoon and the vapour allowed to circulate in the buccal cavity and to work on the infected tooth.

(88) *Solena heterophylla*

See (11).

(89) *Sonerila maculata*

Loc. Lailad: roots boiled and taken for stomach ailments.

(90) *Tabernaemontana divaricata*

Loc. Sohkha: leaf-paste applied on forehead, relieves headache and fever;

Loc. Iooksi: whole plant, boiled and taken, claimed to have anthelmintic properties.

(91) *Thevetia peruviana*

Gohai-phul—Loc. Byrnihat: leaves crushed into a paste, applied on the forehead relieve childrens' ailments.

(92) *Thysanolaena maxima*

Synsar—loc. Lailad: when eyes become red and dirty, juice of young stems applied on eye with a feather.

(93) *Trachyspermum khasianum*

Loc. Raliang: mashed leaves and stems applied on septic wounds.

(94) *Valeriana hardwickii*

Loc. Jongksha: for scaly skin diseases, leaves made into a paste, and applied.

(95) *Vitis barbata*

Loc. Lailad: to liberate pus from boils, the paste of rhizome applied over the boils.

(96) *Vitis capreolata*

Loc. Lailad: leaf-paste applied on wounds and boils to liberate the pus.

(97) *Vitis lanceolaria*
See (18).

(98) *Zingiber officinale*
See (2), (3), (20), (27).

(99) *Zingiber rubens*
See (26).

(100) *Zizyphus mauritiana*
Soh-broi—used as a stomachic; fruits made into chutneys.

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ETHNOBOTANICAL STUDIES ON SOME ADIVASI TRIBES OF NORTHEAST INDIA WITH SPECIEL REFERENCE TO THE NAGA PEOPLE

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ABSTRACT

Ethnobotany is a holistic study which involves the reciprocal and dynamic aspect of the interactions of Adivasi people with plants.

In this article an account of the different adivasi groups in different states along with a detailed analysis of human-plant relationship among the 'Naga' people of Nagaland is highlighted.

Nagaland is mainly a hill state (25° 6′–27° 4′N and 93° 20′–95°15′ E) inhabited chiefly by a people broadly called as the Nagas, who have their own beliefs, traditions, customs, diafects and cultural heritage. The Nagas are an 'Indo-Mongoloid folk' divided into 16 distinct subtribes. Although these subtribes have their own dialects, and cultural features they all practise the so-called jhuming or the shifting agriculture. All Naga tribes prefer to live on high hill tops in small villages comprising of 10-12 huts only. The details of origin, life style, their subsistence and the role of wild plants in the life of these Nagas are discussed.

One hundred twentyfive plant species used by mainly two subtribes, (the 'Ao' and the 'Angami' nagas) are enumreated, along with their local names, family uses and reference of voucher specimens (deposited in the herbarium of North-Eastern Hill University, Shillong).

Finally, in view of the developmental activities and setting up of medical centres making people to switch over from their age old herbal remedies to modern cures, the urgency is expressed for carrying out detailed ethnobotanical studies among all subtribes of the state.

1. *Botanical Survey of India, Calcutta-700001.*

Introduction

The adivasis form a considerable part of India's population. According to a recent census their number exceeds 36 million. The tribal people live at different economic levels, from food gathering and hunting through shifting cultivation to settled agriculture. They live in hills and dense forests, in close-kit and self sufficient communities often isolated from communication routes and from any significant economic developments in the country.

The Naga tribe is one such broad type occupying the present hill state of Nagaland (25° 06′–27° 04′ N and 93° 20′–95° 15′ E) in the subhimalayan zone.

These people depend on the sorrounding forests for almost all their daily needs. The role of some plant species in the life of the two Nagas tribes, the Ao and the Angami Nagas, is discussed here.

The broad term Naga tribe includes several sub-tribes which are confined to different regions in the state as follows:

District	Subtribes
Kohima	Angamis, Zeliangs, Rengmas
Phek	Chakkesang, Puchuris
Mokokchung	Aos
Wokha	Lothas
Zunhetoto	Semas
Tuensang	Chang, Sangtam Yamchunger, Phom, Semas and minor groups
Mon	Konyaks

These sub-tribes were till recently war-loving people hostile to one another with a strong inclination to quarrels and disputes with the result that they constantly waged war among themselves and head hunting became a common practice.

Agriculture

Nagas are primarily agriculturists and mainly practice shifting cultivation. The method and extent of shifting cultivation also varies from tribe to tribe. For example, the system of agriculture of Konyak is much more primitive than that of the Angamis.

In early autumn, the elders of the village council decide on a

particular piece of land to be subjected to jhum. It is from the land collectively owned by the community.

The clearing of the land is the work of individual families. The old men and women cut down the undergrowth with their *daos* and the young men, the trees. Then the felled jungle is left to dry for several weeks and it is then burnt in January or February. The ashes provide a valuable fertilizer. Before sowing, the charred pieces of wood are collected and removed. These people have real co-operative farming. The young people join hands and cultivate each others fields in rotation. While working in the fields they collectively sing and shout. Some subtribes perform no rites or ceremonies till the sowing begins.

They also cultivate *Taro*, a tubercular fruit, which perhaps was the original staple food of Nagas, before the introduction of rice. This crop is mainly sown by women by making small holes in the ground and placing the tubers. It is also the women's task to carry home the harvest. This crop is rarely cultivated in India and not even known in many parts of the country. There seems to be considerable potential in popularising this crop in other parts of the country too.

Weeding is an important task on which much energy is spent. This is also done collectively by all boys and girls, hired from 'Morung'—(dormitory-like houses for unmarried boys and girls).

During weeding operation in rains, women wear large rain-shields made of palm leaves. The boys and their girl friends sing together while weeding; removes monotony.

Apart from rice, other crops required by them, such as spices, are also cultivated in these jhums.

Drink. All tribes generally are fond of some kind of fermented liquor. Nagas prepare a kind of rice beer called *ruhi*, a strong frothy beverage. It has intoxicating smell and tastes like old grape wine. *Ruhi* is a much stronger drink than the ordinary rice beer called *Zu*, which contains rice particles. They drink this in bamboo mugs with straws made of narrow bamboo pipes.

Hunting. Like other tribes, Nagas are also largely game hunters. Their weapons are mainly the spear, *dao* and poisoned arrows. Any game they hunt is celebrated with joy and is served to all, a trait unlike many other tribal groups. The

animal Mithun is a great delicacy for them. It is even used in financial transactions or for negotiating the bride price.

Tattooing. Tattooing is common among Nagas, particularly among women. The operation of tattooing is carried out in jungle by elderly women who have intimate knowledge of this art. This knowledge is passed on from mothers to daughters. Tattooing is done with cane thorns attached to a wooden handle. Before the operation, the skin is marked with a piece of wood dipped in colouring matter made from the sap of a tree locally called '*naphti*'.

Other ethnobotanical aspects of interest

The several subtribes of Nagas are entirety dependent on plants/plant products for their day-to-day requirements. Bamboos are extensively used for bringing water from rivulets in steep valleys, and also as storing vessels. Bamboos are used for making combs of various types, for bows and arrow, and for making very sturdy and ornamental basket for storing rice, spices, etc. Bamboos also find place in construction of huts. Floors and walls are plaited out of bamboo. Bamboos are also used as fire sticks. But now they are being replaced by match sticks.

Canes are equally used by all Naga tribes. The cane helmets and cane shields are always used by Naga warriors. It is not possible to list out all the numerous uses of bamboos and canes here. Palm leaves are used by almost all subtribes for thatching the roofs also as rain shields in monsoon.

Nagas are a clean folk unlike othe tribes. They regularly wash their head with a kind of '*Naga soap*'. A fibrous stalk of a creeper (botanical name not certain) when pounded gives a lather not un-like that obtained from ordinary soap (Ganguli, 1984).

The phoms are experts in wood carving work, an art which is also slowly vanishing. They make excellent tobacco pipes from the hard wood of several trees.

Enumeration of some plant species commonly used by Nagas (after Rao & Jamir 1982; Megoneitso & Rao, 1983).

In the following enumeration, the species are alphabetically arranged. Local names for these plants are mentioned in parenthesis after the botanical names and these refer to Ao and

Angami names (the latter abbreviated as An.). Then follow the family name and detailed uses, as reported by the local informants during field studies. Voucher specimens cited at the end of each entry are deposited in the Herbarium, North-Eastern Hill University, Shillong (NEHU).

Medicinal plants

Acacia gageana Changru tong (Ao) Mimosaceae.

The young shoots and leaves eaten for stomach ache and dysentery.

Acanthus leucostachyus Tua-aing (Ao) Acanthaceae.

The leaf paste and juice applied on cuts and injuries as hemostatic to stop blood. *Jamir* 407.

Acrocephalus hispidus *Imramolitong* (Ao) Lamiaceae.

The leaves are boiled in water, and bath is taken with this water during high fever. *Jamir* 309.

Alternanthera sessilis Aluza, Kontry (An.) Amaranthaceae.

The whole plant along with leaves of *Hibiscus rosa-sinensis* ground into a paste and applied on the fractured part and tied with a cloth for quick healing. This paste is also applied as hemostatic for cuts and injuries. *Jamir* 405.

Aphanamixis polystachya Akawatong Meliaceae.

The bark is sun dried, made into a powder, and used as tooth powder to kill germs and to keep the teeth strong. *Jamir* 15.

Bauhinia purpurea Weiben tong Caesalpiniaceae.

The flowers and buds are ground into a paste, mixed with water and taken for indigestion. A paste from the bark is given in cancerous growth in the stomach, locally known as 'chapo'. It is said that this paste is really effective in dissolving the tumor. *Jamir* 170.

Brugmansia suaveolens Dattura (Ao, An.) Solanaceae.

The leaves are slightly warmed on fire and rubbed on the whole body for body pain; the flowers and fruits are poisonous. *Jamir* 303.

Buddleia macrostachya Tipokia-moli Loganiaceae.

The leaves are warmed on fire and applied to cure a kind of venereal disease, locally known as 'Yaongra' disease. *Jamir* 163.

Calotropis gigantea Numsubamoli, Akon(Ao, An.) Asclepiadaceae.

The root bark is ground into a fine paste and drunk with water for navel diseases and stomach ache. The flowers and the root bark are mixed together and eaten for bite of mad dog. The latex from the plant is used as ear drop for ear pain; it is also applied for skin diseases, especially ringworm. The leaves are rubbed on the whole body for body pain and on fractures. *Jamir* 404.

Cucurbita moschata Moyamatsu Cucurbitaceae.

The pedicel or stalk of the fruits is rubbed on a stone and the resultant powder is applied to stop bleeding from the navel portion of children. *Jamir* 204.

Cymbidium grandiflorum Nokchamoli-akongtong (Ao) Orchidaceae.

The powdery seeds are applied on cuts and injuries as haemostatic. *Jamir* 506.

Didymosperma nana & Tialong (An.) Arecaceae.

The young shoots are ground and applied to diseases of hooves of cows, buffalo, etc. *Jamir* 514.

Euphorbia nivulia Takratong (Ao) Euphorbiaceae.

The plant is heated on fire and the juice is extracted by compression, which is taken for severe cough and fever, especially in children. *Jamir* 308.

Gonatanthus pumilus Tsungremlongtong (An.) Araceae.

A paste made from rhizome is rubbed on the chest for chest pain. *Jamir* 1.

Holboellia latifolia Mezutsuk-moli Berberidaceae.

The leaves are crushed properly with a few drops of water and the resultant foamy substance is applied on burns. *Jamir* 30.

Hydrocotyle javanica Pink-pat, Longtokorokla-tasola, (Ao) Apiaceae.

The whole plant is ground and mixed in water and drunk in case of high fever. *Jamir* 402.

Kalanchoe pinnata Nokchamoli (Ao) Crassulaceae.

The leaf paste is applied on cuts and injuries as haemostatic; the decoction of the leaves is drunk for stomach ache. *Jamir* 519.

Maesa chisia Kozalongritong (Ao) Myrsinaceae.

The leaves are slightly warmed and kept on eyes in case of eye diseases such as pain in eyes. *Jamir* 125.

Melia azedarach Kaosujang (Ao) Meliaceae.

The powder of bark is mixed in water and drunk for dysentery and other disorders of stomach. *Jamir* 501.

Morus indica Nokafisera (An.) Moraceae.

The latex of this species mixed with the latex of *Ficus bengalensis* is dropped in eyes for the eye disease called 'mengang'. Only one or two drops are put. *Jamir* 401.

Nephrolepis cordifolia Seratongenjen Nephrolepidaceae.

The tubers are chewed in nose blockage, and for free breathing. *Jamir* 161.

Ocimum sanctum Dolse (An.) Lamiaceae.

The decoction of the leaves is drunk for cough. *Jamir* 302.

Paederia foetida Tzumenumli (An.) Rubiaceae.

The leaves are eaten to kill intestinal worms, and also for liver diseases. *Jamir* 172.

Phlogacanthus thyrsiflorus Sitaful (An.) Acanthaceae.

The decoction of flowers and leaves is drunk for stomach ache. *Jamir* 300.

Tetracera sarmentosa Pongikongchatong (Ao) Dilleniaceae.

The clear liquid that oozes out from the cut ends of twigs is used as eye drop for eye diseases like pain in eyes. *Jamir* 408.

Ziziphus mauritiana Kitang-karosu (Ao) Rhamnaceae.

The powder of the bark is mixed in water and drunk for dysentery and typhoid fever. *Jamir* 406.

Wild edible plants

Allium chinense Tejanglasungtong (Ao) Liliaceae.

The whole plant is used as a vegetable; and also for flavouring curries and other preparation. *Jamir* 33.

Alpinia bracteata Tsenlusutong (Ao) Zingiberaceae.
The young inflorescence is eaten as a vegetable. *Jamir* 307.

Alstonia scholaris Lazarongpong (Ao) Apocynaceae.
The bark and the young leaves are eaten as vegetable. *Jamir* 46.

Aphanamixis polystachya Akawatong (Ao) Meliaceae.
The seeds after removing the seed coat are eaten. *Jamir* 15.

Ardisia thomsoni Tejaba sungjang (Ao) Myrsinaceae.

(The fruits are edible. *Jamir* 510.)

Artocarpus chaplasha Tazutong (Ao) Moraceae.
The fruits are edible. The inner bark of the roots and stems are eaten as a masticatory along with betel nut. *Jamir* 43.

Baccaurea ramiflora Tangtsusu (An.) Euphorbiaceae.
The fruits are edible. *Jamir* 105.

Bauhinia purpurea Welben-tong (Ao) Caesalpiniaceae.
The flowers and young leaves are consumed as vegetable. *Jamir* 170.

Begonia laciniata Alikchbatong (Ao) Begoniaceae.
The whole plant is eaten as a vegetable. *Jamir* 134.

Calamus erectus Arotong (Ao) Arecaceae.
The fruits after removing the pericarp, are edible. *Jamir* 197.

Calamus jenkisianus Woktitong (Ao) Arecaceae.
The fruits and the young shoots are edible.

Callicarpa arborescens Kachetong (Ao) Verbenaceae.
The young shoots are eaten as vegetable; the inner bark of the stem is eaten with betel nut as masticatory. *Jamir* 21.

Canarium strictum Liangjang (Ao) Burseraceae.
The seeds are eaten. *Jamir* 502.

Cardamine hirsuta Ingnat-tasola (Ao) Brassicaceae.
The leaves are cooked and eaten as a vegetable. *Jamir* 192.

Castanopsis indica Lezutong (Ao) Fagaceae.
The seeds after removing the testa are eaten. *Jamir* 206.

Carvota urens Asangtong (Ao) Arecaceae.
The fruits are eaten; the young shoots are eaten as a vegetable. The pith portion of the stem is dried, powdered and consumed as floor. *Jamir* 159.

Capsicum annum Meretsu, Mersu (Ao, An.) Solanaceae.
Apart from the fruits, the young leaves are also eaten as a vegetable. *Jamir* 128.

Centella asiatica Insenkoroklatong (Ao) Apiaceae.
The leaves are used as a vegetable. *Jamir* 69.

Clerodendrum bracteatum Uromatong-taloba (An.) Verbenaceae.
The leaves and the young shoots are used in preparation of local wines. *Jamir* 10.

Clerodendrum colebrookianum Orematong (Ao) Verbenaceae.
The young shoots are eaten as a vegetable. *Jamir* 14.

Coix lachryma-jobi Menjang (An.) Poaceae.
The grains are used by the local people as a staple food (instead of rice). *Jamir* 111.

Colocasia esculenta Amitong (Ao) Araceae.
All parts of the plant are eaten after cooking. *Jamir* 108.

Curculigo capitulata Tosojuni, (Ao) Amaryllidaceae.
The young leaves are eaten as vegetable. *Jamir* 16.

Dioscorea pentaphylla Atungtong (Ao) Dioscoreaceae.
The rhizome is eaten after cooking. *Jamir* 118.

Diospyros lanceaefolia & Rujatong (Ao) Ebenaceae.
The fruits are edible. *Jamir* 72.

Debregeasia longifolia Sesepwatong (Ao) Urticaceae.
The fruits are eaten, either as such or cooked. *Jamir* 199.

Docynia indica Mekoit (An.) Rosaceae.
Fruits are edible. *Jamir* 207.

Elatostemma sessile Engpangsunga (Ao) Urticaceae.
The leaves are used as vegetable. *Jamir* 505.

Eleocarpus floribundus Sungamerenjang (Ao) Eleocarpaceae.
The fruits are edible. *Jamir* 153.

Eryngium foetidum Remoklawa (Ao) Apiaceae.

The leaves are used as a flavouring agent, in place of *Coriandrum sativum* leaves. *Jamir* 200.

Eurya acuminata Alomesetong (Ao) Ternstroemiaceae.

The young leaves are eaten as vegetable, and the seeds used as a spice. *Jamir* 22.

Ficus cunia Korosutong (Ao) Moraceae.

The fruits are eaten; the inner bark of the stem is eaten as a masticatory along with betel leaf. *Jamir* 191.

Garcinia pedunculata Sungsulasu (Ao) Clusiaceae.

The ripe fruits are eaten. *Jamir* 511.

Gnetum gnemon Melemjangtong (Ao) Gnetaceae.

The female cones form delicious food of the Nagas; the leaves are eaten as a vegetable. *Jamir* 39.

Hibiscus rosa-sinensis Betjongnaro (An.) Malvaceae.

The young leaves are eaten as a vegetable. *Jamir* 104.

Hodgosonia heteroclita Asatong (Ao) Cucurbitaceae.

The seeds are edible after removing the testa. *Jamir* 304.

Houttuynia cordata Alimoli (An.) Piperaceae.

The leaves are eaten as a vegetable; it is said that they purify blood. *Jamir.*

Hydrocotyle javanica Longssokorokla-tasola (Ao) Apiaceae.

The leaves are eaten as a vegetable. *Jamir* 402.

Laportea bulbifera Saklo-tasola (Ao) Urticaceae.

The young leaves and inflorescence are used as vegetable; mature leaves have stinging hairs and are avoided. *Jamir* 198.

Lasia heterophylla Torangtong (Ao) Araceae.

The young leaves are eaten as vegetable. *Jamir* 71.

Manihot esculenta Alicha (An.) Euphorbiaceae.

Apart from the tubers, the young leaves are eaten as a vegetable. The tubers are also used in preparation of local wines. *Jamir* 305.

Mussaenda glabra Sapaklarinaro-azu (Ao) Rubiaceae.

The ground bark is used in preparation of local wine. *Jamir* 306.

Nephrolepis cordifolia Seratong-enjem (An.) Nephrolepidaceae.
The tubers from the roots are edible, either cooked or raw. *Jamir* 161.

Oenanthe javanica Apiaceae.
The whole plant is used as vegetable. *Jamir* 508.

Osbeckia crinita Imlaklasutong (Ao) Melastomaceae.
The ripe fruits are edible. *Jamir* 147

Plantago major Akaba (An.) Plantaginaceae.
The leaves eaten as vegetable.

Pinanga gracilis Koitasola (Ao) Arecaceae.
Ripe fruits are eaten. *Jamir* 518.

Polygonum molle Masumalangjatong (Ao) Polygonaceae.
The young shoots are eaten as a vegetable; the flower and the nuts are fed to poultry, pigs, etc. *Jamir* 20.

Punica granatum Talium-jaramnaro (An.) Punicaceae.
Apart from the well known edible fruits (Panegranate), the leaves are also eaten as a vegetable. *Jamir* 121.

Rhus semialata Tangma-tong (Ao) Anacardiaceae.
The young leaves are consumed as vegetable; the ground seeds are eaten to neutralise the effect of mushroom poison. *Jamir* 85.

Rhynchotechum ellipticum Zoopatong (Ao) Gesneriaceae.
The leaves are used as vegetable. *Jamir* 92.

Rubus ellipticus Jenbensu-Aisalo (An.) *R. moluccanus* L. *Jembensu-temeremla* (An.) Rosaceae.
The ripe fruits are eaten. *Jamir* 186, 133.

Solanum indicum Longkoksu-tasola (Ao) Solanaceae.
The ripe fruits are edible either cooked or raw; the leaves are ground along with rice and this powder is used in the preparation of local drinks known as 'yi' or 'azu'. *Jamir* 122.

Thea chinensis Sungo, Seatong (Ao) Theaceae.
This is the tea plant, the leaves of which are chewed to remove any foul smell from the mouth. *Jamir* 81.

Zanthoxylum acanthopodium Changpet (An.) Rutaceae.

The fruits and seeds are used as a spice and the leaves as vegetable. *Jamir* 50.

Zanthoxylum rhetusa Mongru-tong (Ao) Rutaceae.

The leaves are used as vegetable and the seeds as spice. *Jamir* 50A.

Miscellaneous uses

Alstonia scholaris Lazarongpang (Ao) Apocynaceae.

The twigs are used in making rings called 'Kumpang' which are used while dancing during festival. *Jamir* 46.

Aphanamixis polystachya Akawatong (Ao) Meliaceae.

The leaves are used in fishing; the ground leaves are thrown into water, this stupefies the fish, facilitating easy catch. The ground bark is used as a dyeing agent to produce dark-green colour. *Jamir* 15.

Anthogonium gracile Akongtong (An.) Orchidaceae.

The ground rhizome (pseudobulb) is used as adhesive gum. *Jamir* 17.

Artemesia nilagirica Pina, Diti-bati (An.) Asteraceae.

Local people have some superstitious beliefs about this plant. They place this plant in front of the doors or below their pillos and believe that ghosts or spirits will not enter their houses. This plant is also used during worship in festivals.

The leaves are burnt to drive away insects and also for purification of air. *Jamir* 7.

Artocarpus heterophyllus Piongtong (Ao) Moraceae.

The wood is kept in water for few days and then used for making all kinds of handles for implements. The latex from this plant is used for closing holes in earthen vessels. *Jamir* 84.

Acacia gageana Changrutong (Ao) Mimosaceae.

The ground bark is used for fishing. *Jamir* 513.

Buddleja macrostachya Loganiaceae.

The leaves are used for dyeing purpose; they give a yellow colour to cloth. *Jamir* 517.

Cheilanthes farinosa Injentong, *Rani-sinka* (An.) Adiantaceae.
The leaves are poisonous.

Clerodendrum Colebrookianum Orematong (Ao) Verbenaceae.
The ripe fruits are used for catching birds in forests. *Jamir* 134.

Cyclosorus callosus Maachitong (Ao) Thelypteridaceae.
The leaves are ground and powder used in fishing. The plant also used to drive out insects in poultry. *Jamir* 95.

Dendrobium densiflorum Akongtong (Ao) Orchidaceae.
The yellow bark of the stem is used in making ear rings commonly called by locol women as 'Tongpang'. *Jamir* 507.

Diospyros lanceaefolia Rujatong (Ao) Ebenaceae.
The ground fruits are used to kill or stupe for fish. *Jamir* 72.

Eupatorium odoratum Inkongjurungtong (An.) Asteraceae.
The ground leaves are used for fishing; the ground leaves are also helpful in collecting the earthworms, which are used for fishing. *Jamir* 87.

Ficus elastica Nisatong (Ao) Moraceae.
The latex of this tree is used for catching the birds; this latex is boiled and rubbed on the sticks, which are placed on the fruit trees or below the trees in jungle for catching the birds. *Jamir* 38.

Gynocardia odorata Alemba-sera (Ao) Flacourtiaceae.
The leaves are used for blocking the bee-hives, so that the bees become unconscious and fall down and the honey can be gathered easily. *Jamir* 203.

Lantana camara Aingtong (Ao) Verbenaceae.
Apart from using this plant for hedges, the twigs are used as toothbrush. *Jamir* 88

Lygodium flexuosum Aochani (Ao) Schizaeaceae.
There is a superstitious belief among the people regarding this fern. If this fern is encountered while harvesting the paddy it is believed that the harvest will be poor in that y.are *Jamir* 63.

Magnolia pterocarpa Tsuang-jang (Ao) Magnoliaceae.

The red seeds are used for catching birds; the seeds are placed in a special locally prepared trap for catching birds. *Jamir* 158.

Milletia pachycarpa Sulitong (Ao) Fabaceae.

The underground part and the stem portion is ground and thrown in water to kill fish. *Jamir* 54.

Mesua ferrea Mangitong (An.) Clusiaceae.

The wood is used for the handles of spears, daos, axes and for instruments for weaving cloth. *Jamir* 109.

Nicotiana plumbaginifolia Tongatong (Ao) Solanaceae.

The local girls use the dried leaves for smoking called 'sulemtonga'. The ground leaves are also used as germicide for animal wounds. *Jamir* 99.

Oreochnide integrifolia Yesa (An.) Urficaceae.

The stems are used for making cloth, threads, bags and fishing nets. *Jamir* 152.

Pandanus tectorius Korongtong (Ao) Pandanaceae.

The leaves are used in making arrows for better aim. *Jamir.*

Pueraria hirsuta Anetli (Ao) Fabaceae.

The plant is crushed and used to kill fish. *Jamir* 12.

Ricinus communis Pakatong (Ao) Euphorbiaceae.

The plants are grown for rearing eri-silk worms. *Jamir* 57.

Rhus griffithii Polai (An.) Anacardiaceae.

The juice of this plant causes blisters on the skin and local people even avoid looking at this plant. *Jamir* 181.

Rhus semialata Tangma-tong (Ao) Anacardiaceae.

The ashes from stem are mixed with a kind of hard stone and fried and this powder is used by the local people as gunpowder called 'sara'. *Jamir* 85.

Rhus succadanea Charak-tong (Ao) Anacardiaceae.

The sap of this plant causes skin diseases. *Jamir* 24.

Sapindus mukorossi Charangsu-jang (Ao) Sapindaceae.

The fruits are used for washing; seeds are eaten. *Jamir* 40.

Schima wallichiana Mechang-tong (Ao) Ternstroemiaceae.

The powder from the dry bark is fed to cattle to kill intestinal worms; this is also used to kill fishes. *Jamir*.

Scurrula parasitica Mayingnarotong (Ao) Loranthaceae.

The inflorescene is made into a sticky paste for catching birds in forests. *Jamir* 196

Stereospermum chelonoides Mesutong, Singpet (Ao) Bignoniaceae.

The bark is used as a dyeing agent. *Jamir* 120.

Strobilanthes decurrens Mosak, Osak (Ao) Acanthaceae.

This plant is very valuable for local people. It is a good dyeing agent and it produces two colours—blue-black by boiling the dry leaves, and black colour by boiling the fresh leaves. *Jamir* 165.

Trichosanthes wallichiana Muzum-tong (An.) Cucurbitaceae.

The poisonous fruits are used as bait for killing monkeys visiting cultivated fields. *Jamir* 184.

Zanthoxylum acanthopodium Changpet (An.) Rutaceae.

The fruits are used to kill fishes. *Jamir* 50.

Conclusion

Ethnobotanical studies among the Ao and Angami Nagas of Nagaland have revealed the uses of 28 medicinal plants, 57 wild edible plants and 36 plants of miscellaneous uses. This is only a preliminary study and more exhaustive studies with reference to different tribes in the state are necessary in order to assess and utilize in a balanced manner the vast natural resources.

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20

OBSERVATIONS ON WILD EDIBLE PLANTS FROM HILLY REGIONS OF MAHARASHTRA AND GOA

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ABSTRACT

This article presents results of a preliminary survey of the wild plants used as food by the tribals of the hilly region of Western Ghats in Maharashtra and Goa.

One hundred and twenty species of flowering plants and ferns known for their use as food are recorded. 58 species are in common use, 27 are used occasionally and the remaining reluctantly consumed during severe drought and scarcity of conventional food. The local names, parts used for consumption and future prospects of the work are given.

Introduction

The rugged region of Sahyadri Hills (Western Ghats) is well known for its scenic beauty. One would often see the panoramic view of the deep ravines and rich flora and fauna in reserve forests. However, the living conditions of the local population show an unhappy contrast to nature's grandeur. The villages and the hamlets are situated far away in the remote, inaccessible areas of the hilly country and are devoid of modern amenities or facilities. Cultivable land is so scarce that agricultural produce is hardly sufficient to last for five to six months. For the remaining part of the year the local people depend on trapping or hunting wild animals and collecting wild edible plants. Before the dawn of modern civilisation, the

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entire area was clad with thick forests and was full of wild life. Aboriginees dwelling in the dense forests used to get their basic requirements like food, shelter, and body cover from the forest produce. Nature was so kind that during the last thousands of years it had been possible for the tribal population to live with comparative ease, simply by hunting and food gathering.

With the rapid approach of civilisation and the population explosion, major portions of the forest tracts have already been removed. Exposed nomadic tribes are now pouring into towns and cities and are working as labourers on village farms and road constructions, on low daily wages. Hence there is urgent need to undertake ethnobotanical studies of these areas before the extinction of the tribal culture through aggressive modern civilisation.

Few casual references were made to wild food plants in the regional or local floristic studies by Dalzel and Gibson (1861), Birdwood (1887-1897), Nairne (1894), Woodrow (1909-1911), Cooke (1901-1908), Blatter (1926-1935), Santapau (1953, 1956), Vartak (1959), Datar and Vartak (1975) and Gadgil and Vartak (1975, 1976). Notes made by early workers are no doubt informative but rather fragmentary, incomplete and mostly restricted to small areas or localities. It was therefore, proposed to bring together all these scattered reports and supplement the data available from them by further field studies in the area under consideration. It was thus possible to present a consolidated botanical checklist of the wild edible plants from the Western Ghats.

In the present article the ethnobotanical observations regarding the wild food plants from the tribal areas of the Western Ghats are presented.

Area of study

The area under study includes the three districts of Konkan, the hilly western terrain of Maharashtra and Union Territory of Goa. It is located between 14° 49′ and 20° 05′ and 73° 0′ and 75° 10′ E, constituting an area of about 20,000 sq km, about one fifth of the gross total area of Maharashtra State. It is bounded towards the west along its entire length by the Arabian sea while the eastern boundary includes the crest of ghats and its gentle spurs extending towards the east.

The climate of western Maharashtra is typically monsoonic in character. The total annual rainfall varies over a wide range with an average of about 200 cm along the sea face; it may reach to about 600 cm or even more in the hilly regions along the descending slopes and plains, a peculiar 'rain shadow' phenomenon is observed and precipitation abruptly decreases as one proceeds from the crest to the eastern terrain.

Vegetation

The climate, soil and the biotic factors are the most important agents which have been responsible for the development of different vegetation types. Considering the regional topography with the narrow coastal plains of Konkan rising almost abruptly towards the east with adjoining foothills that ascend to about 1200 metres or more, the vegetation shows a spectrum of variability along west to east, the gradient being correlated with the ascending contours from the sea coast to the crest line of the ghats and along the gentle eastern plains.

Some edible wild plants grow as weed and are omnipresent on various habitats, e.g., *Portulaca oleracea*, L., *Oxalis corniculata* L., *Impatiens balsamina*, *Cassia tora*, *Euphorbia hirta*, etc. Ephemerals like *Ceropegia lawii*, *Dioscorea pentaphylla Chlorophytum tuberosum*, *Tacca pinnatifida*, etc., are only available during the monsoon. Studies on habitat preference, autoecology of the relevant species in various types of vegetation is necessary for understanding the growth pattern of the concerned species.

While compiling the floristic work of the area, special attention was paid to the wild food plants. Observations regarding their occurrence, abundance, flowering and fruiting time were noted. Careful notes were taken about the part of plant used as food and the preparation of the recipe. The voucher specimens of most of the plants were preserved and deposited in the M.A.C.S. Herbarium. In Table 1, each species has its botanical name, local name, and part used for food.

Resume and further prospects

From the 120 wild edible plants as shown in the Table and so far recorded from the Western Ghats, 15 species yield corms, tubers or starchy rhizomes, 42 species are known for their

Table 1. Enumeration of wild edible plants

Botanical name	Local name	Edible part
1	2	3
Dillenia pentagyna	*Karmal*	Ripe fruits
Cocculus hirsutus	*Vasanvel*	Tender leaves
Nymphaea nouchailii	*Kamal*	Root stalk, seeds
Capparis spinosa	*Kabar*	Floral buds
Crataeva nurvala	*Wayvarna*	Young leaves, fruits
Cleome viscosa	*Pivli tilwan*	Young shoots
Flacourtia latifolia	*Tambat*	Fruits
Portulaca oleracea	*Ghol*	Leaves
Bombax ceiba	*Lal-sawar*	Unripe fruits
B. insigne	*Lal-sawar*	Unripe fruits
Sterculia guttata	*Goldoda Goldar*	Seeds
S. urens	*Kandol*	Seeds
Ttiumfetta rhomboidea	*Nichardi*	Leaves
Grewia tiliaefolia	*Dhaman*	Fruits
Oxalis corniculata	*Ambushi*	Leaves
Impatiens balsamina	*Terda*	Seeds
Garuga pinnata	*Kakad*	Fruits
Zanthoxylum budrunga	*Triphal*	Leaves & fruits

Zizyphus mauritiana	*Bor*	Fruits
Z. rugosa	*Toran*	Fruits
Cayratia trifolia	*Khajoli-vel*	Leaves
Ampelocissus latifolia	*Kaajoli-vel*	Fruits
Cissus quadrangularis	*Kandvel*	Stems, leaves
C. repanda	*Gendal*	Stems
Leea indica	*Dinda*	Fruits
Schleichera oleosa	*Kosamb*	Seed aril
Euphoria longan	*Umb*	Fruits
Mangifera indica	*Amba*	Fruits
Buchanania lanzan	*Char*	Fruits
Abrus precatorius	*Gunj*	Leaves
Vigna radiata	*Ran-mug*	Seeds
Ougeinia oojeinensis	*Tivas*	Flowers
Sesbania bispinosa	*Sawari*	Seeds
Smithia blanda var. *racemosa*	*Barka*	Leaves
S. purpurea	*Nila-Kaula*	Leaves
S. setulosa	*Pivla Kaula*	Leaves
Vigna vexillata	*Halunda*	Tubers
Mucuna monosperma	*Koyali (Mothi)*	Seeds
Pueraria tuberosa	*Pithana*	Tubers
Bauhinia racemosa	*Apta*	Seeds

1	2	3
B. purpurea	*Kanchan*	Flower buds, seeds
B. vahlii	*Chambul*	Young pods, seeds
B. malabarica	*Amli*	Young flowers
Cassia fistula	*Bahava*	Flowers
C. tora	*Takla*	Young leaves
Terminalia bellirica	*Beheda*	Seeds
T. chebula	*Hirda*	Seeds
Syzygium cumini	*Ran-jambhul*	Fruits
Careya arborea	*Kumbha*	Root bark
Woodfordia fruticosa	*Dhavti*	Flowers
Cucumis melo	*Meki*	Fruits
Momordica dioica	*Kartoli*	Roots, leaves, fruits
Heracleum pinda	*Pundha*	Roots
Meyna spinosa	*Alu*	Fruits
Pavetta indica	*Phapti*	Flowers
Sonchus asper	*Mhatara*	Tender shoots
Embelia tsjeriam-cottam	*Vavdungi*	Seeds
Madhuca longifolia	*Mohada*	Flowers, seeds
Diospyros melanoxylon	*Govindu*	Fruits
Jasminum malabaricum	*Kusar*	Fruits

Holostemma annulare	*Shindoli*	Young leaves
Ceropegia lawii	*Kharpudi*	Tubers
C. bulbosa	*Khantodi*	Tubers, leaves
C. tuberosa	*Khantodi*	Tubers
Caralluma adscendens	*Makadshing*	Stems
Carissa congesta	*Karvand*	Fruits
Wrightia tinctoria	*Kala kuda*	Flowers
Cordia wallichii	*Bhokar*	Fruits
Ehretia laevis	*Dhatrang*	Fruits, inner bark
Solanum indicum	*Chicharti*	Fruits
S. nigrum	*Kangani*	Fruits
Calonyction muricatum	*Garia*	Fl. calyx
Ipomoea eriocarpa	*Kumpan vel*	Leaves, seeds
Clerodendron serratum	*Bharangi*	Leaves
Gmelina arborea	*Shivan*	Fruits
Amaranthus polygamus	*Math*	Tender leaves
A. spinosus	*Kate-math*	Tender leaves
Celosia argentea	*Kurdu, Kombda*	Tender shoots
Chenopodium album	*Chandan-batva*	Tender leaves
C. murale	—	Tender shoots
Polygonum glabrum	*Paral*	Leaves, fruits
Elaeagnus latifolia	*Amguli*	Fruits

1	2	3
Bridelia retusa	*Asana*	Ripe fruits
B. stipularis	*Ashind*	Ripe fruits
Emblica officinalis	*Avala*	Ripe fruits
Euphorbia hirta	*Dudhi, Nayati*	Tender shoots
Holoptelia integrifolia	*Vavla*	Seeds
Ficus hispida	*Ran-umbar*	Young fruits
F. racemosa	*Umber*	Ripe fruits
Debregeasia longifolia	*Kapsi*	Fruits
Ensete superba	*Chaeen, Kaudar*	Young offshoots, Inflorescence
Curculigo orchioides	*Kali Musali*	Roots
Curcuma zerumbet	*Ran-halad*	Tubers
C. neilgherrensis	*Shindal van*	Rhizomes
Costus speciosus	*Kosta*	Root stalk, shoots
Dioscorea bulbifera	*Kadu-Karanda*	Tubers
D. pentaphylla	*Shend-val*	Tubers, flowers
D. oppositifolia	*Karanda, Paspolee*	Tubers
Asparagus racemosus	*Aswal*	Tubers
Smilax zeylanica	*Ghot vel*	Fruits
Chlorophytum tuberosum	*Kulai*	Leaves
C. laxum	*Kulai*	Leaves

C. borivalianum	*Kulai*	Leaves
Commelina benghalensis	*Kena*	Leaves
Caryota urens	*Bherli mad*	Sap, pith
Phoenix sylvestris	*Shindi*	Sap, fruit
Arisaema murrayi	*Badad*	Tubers
Amorphophallus campanulatus	*Jangali suran*	Tubers
Remusatia vivipara	*Garget*	Tubers, leaves
Alocasia indica	*Rukalu*	Tubers, leaves
Tacca pinnatifida	*Devkanda*	Tubers
Cyperus rotundus	*Lavala, Motha*	Tubers
Scirpus grossus	*Kaisur*	Tubers
Saccharum spontaneum	*Munj*	Young shoots
Athyrium esculentum	*Necha*	Young leaves
Lastroa crenulata	—	Young leaves
Pteridium aquilinum	*Brakenfern*	Root stalk
Ceratopteris thalictroides	*Pan-necha*	Leaves
Marsilea minuta	*Choufuli*	Leaves
Ophioglossum reticulatum	—	Leaves

succulent stems, leaves, flowers and gum. Remaining species are noted for edible fruits and seeds. Few species of mushrooms and puff-balls are recorded for their food value. Confirmation of some of these species is awaited.

Among the plants collected, the following species are noted for quenching thirst *Toran* (*Zizyphus rugosa*), *Run Jhambhul* (*Syzygium cumini*), *Avla* (*Emblica officinalis*), *Karavand* (*Carissa congesta*), *Amguli*(*Elaeagnus conferta*), etc. The following species are noted for suppressing hunger: *Dev kand* (*Tacca, pinnatifida*) *Halunda* (*Vigna vexillata*), *Chaeen* (*Ensete superbum*), etc.

Thorough ethnobotanical exploration of various tribal areas may reveal many more such plants having thirst or hunger suppression properties. After consuming salty dry pieces of *Chaeen* or other plant parts mentioned above, one feels a peculiar notion of fulfilment in the stomach without the consumption of actual food. Aborigines can pull on for several weeks with meagre food with the help of the above plants. These materials should be chemically analysed, nutritionally studied for its actual mode of action on the human system and harmful effects, if any.

Tribal people through their ancestral traditional knowledge infer what to eat and what not to eat. They are thoroughly acquainted with the methods of excluding the harmful substances from these wild plants and preparing acceptable recipes for their meagre meals.

Surprisingly such coarse, sometimes unpalatable food (from urban standards) keeps these people strong, though slim in appearance, and they have extraordinary stamina to sustain the hardships of life.

There is much scope for improving the growth forms of wild edible plants by using modern scientific techniques. Experimental cytogenetical studies and plant breeding programmes will evolve better varieties. Agronomical research will help in gross increase in yields.

For all such endeavour, thorough field work in various tribal areas and critical botanical studies on wild edible plants are the basic requirements.

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21

ETHNOBOTANY OF THE RICES OF MALABAR

K.S. Manilal[1]

ABSTRACT

There are 48 primitive tribes living in Malabar, of which 10 have agriculture as their main occupation, while four other tribes are occasional cultivators. Twenty-six primitive rice varieties were collected from these tribes. These rice varieties include *Chenuelu. Navara* and *Modan,* which are considered to be of medicinal value and recorded in ancient literature dating back to the beginning of the Christian era. Seeds of these varieties are maintained in Calicut University. The local varieties are so successfully acclimatised in their respective regions that the tribals prefer these tested and dependable primitive varieties to the reportedly high yielding modern varieties. A screening of the primitive Indian rices to discover possible C_4 varieties among them, if any, was initiated by studying the Malabar rices cultivated by the tribals. Anatomical and biochemical characters show that all of them belong to the more inefficient examples among the C_3 types themselves.

Introduction

Malabar is considered as one of the centres of the origin of rice. There are about 25 species of *Oryza* (Willis, 1966), of which all but two are wild. Of the eight wild species of rice reported from India, seven are found in Malabar, including the recently reported *O. malampuzhaensis* from Palghat (Krishnaswamy and Chandrasekharan, 1958).

The antiquity of rice cultivation in Malabar is also noteworthy. The Greeks came to know about rice from the Arabs

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who used to visit Malabar Coasts for trade as long ago as 3,000 B.C. It is from the Dravidian words *Arri* and *Arrizzi* that the Arab word for rice *Arruzz* originated, from which the Greek *Oruza* and the Latin *Oryza* were formed. References may be found in many ancient works about the important place given to rice in all the social and religious ceremonies in Malabar, which tradition is continued even to the present day.

Although the tribals of Malabar have been known to cultivate many primitive varieties of rice, some recent field investigations have shown that most of them are now discontinuing this due to various reasons, resulting in the total disappearance of those unique varieties. It is important to collect and maintain the germ plasm of all the available rice varieties without any delay, so that they may be preserved for any future work. This task becomes especially important in the present context of attempts for improving the yield of this crop based on the new knowledge about the existence of C_3 and C_4 types of photosynthetic pathways in plants. Rice plants photorespire actively and thus fix carbon dioxide by the C_3 pathway and, therefore, the incorporation of low photorespiratory characteristics of C_4 system in it by any method is quite desirable. Although the conversion of C_3 plants into C_4 plants may not be always possible (Akita, 1976), the conversion of C_4 to C_3 types within a species has already been made possible in a few cases (Kortchak and Nickell, 1970). The low photorespiratory characteristics could be more easily introduced into plants with high photorespiration if there is varietal differences in photorespiration within a given species (Akita, 1976). Such varietal differences in photorespiratory rate have been reported in a few species such as *Lolium* (Wilson, 1972) and tobacco (Zelitch, 1975). No attempts seem to have been made so far to systematically screen the primitive rices of our country or elsewhere to detect any possible C_4 varieties among them.

The present study was undertaken: (1) to collect and preserve all available primitive rice varieties of Malabar, and (2) to initiate a screening of the Indian rices for detecting any possible C_4 varieties among them.

Materials and methods

Mature plants and seeds of the following 26 varieties of

primitive rices (*Indicas*) were collected from various tribes of Malabar:

(1) *Thekken cheera*
(2) *Cherumodan*
(3) *Aryan*
(4) *Mallan puncha*
(5) *Kalladi aryan*
(6) *Kuruva*
(7) *Adakkan*
(8) *Thonnuran*
(9) *Thonnuran thondi*
(10) *Arayanoor thondi*
(11) *Veliyan*
(12) *Velumpala*
(13) *Chennellu*
(14) *Peruvaya andoor*
(15) *Pomathan thondt*
(16) *Pomathan palthondi*
(17) *Punnathan thondi*
(18) *Kottu thondi*
(19) *Rajameni*
(20) *Gandhakasala*
(21) *Navara*
(22) *Modan*
(23) *AMBT-4*
(24) *AMBT-5*
(25) *Wynaad-1*
(26) *Wynaad-2*

Seeds of these varieties are preserved in the Department of Botany, Calicut University.

Transverse sections of fresh leaves (first-formed leaves, older leaves, and leaves just below the spike) were examined to study the anatomical characters, especially structures of the bundle sheath, etc., which give a clue to the type of carbon pathway in the plants, as suggested by Chollet and Ogren (1975) and Seagrave (1976). The ratio of chlorophyll-a/chlorophyll-b in the leaves were determined by the modified Vernon's method (Strain *et al.*, 1971).

Tribes of Malabar and the rice varieties they cultivate

The methods of rice cultivation followed in Malabar are unique in their great diversity. Rice is grown in all regions ranging from some coastal lowlands lying below sea level, to the Wynaad mountains 1,220 m above sea level. The *punam* cultivation done in small forest clearings, *modan* of hill slopes, *oruppu* of terraced hills, *iruppu* of plains, *pokkali* of saline coastlands, *puncha* of shallow-water lands, *kulappala* of deep lakes, etc., are important among them. All possible types of sowing, like broadcasting of seeds, regular planting of seeds, transplanting of germinated seeds or larger seedlings, and mixing of *virippu* and *mundakan* seeds resulting in two harvests from a single planting are practised depending on regional and

seasonal differences. *Punam*, *modan* and *oruppu* are the chief methods followed by the tribals.

Of the nearly 48 distinct tribes present in Malabar (Aiyappan, 1948; Luiz, 1962), agriculture is the principal occupation of only 10 tribes, while 4 other tribes are occasional cultivators. Others are wandering food-gatherers and hunters.

(1) Kurichya

Population about 12,000. Found in Kannoth range, Kannavam, Chembukkavu, Chikkeri, Porakkad, Nedumpoil, Mannanthoddy, Vythiri, Kalpetta, Kuttiyadi, etc. They are mostly engaged in *punam* cultivation. Rice varieties cultivated by them are *Veliyan*, *Chennellu*, *Thonnuran*, *Thonnuran thondi*, *Arayanoor thondi*, *Peruvaya andoor*, *Pomathan thondi*, *Pomathan palthondi*, *Kuruva* and *Aryan*.

(2) Paniya

Population about 50,000. Found in Mannanthoddy, Vythiri, Attapadi, etc. Rice is the main crop they cultivate. An interesting custom among the Paniyas is that the forests are divided into several zones or parishes by them and each zone or parish has a man designated as *Kuttan*, who alone is entitled to plant the first rice seedling in the year. A popular name among the male members of the tribe is *Veliyan*, which is also their favourite rice variety. Apart from *Veliyan*, other rice varieties they cultivate are *Aryan*, *Adakkan*, *Chennellu*, *Kalladi aryan*, *Kuruva*, *Navara*, *Rajameni*, etc.

(3) Mulla kuruman

Population about 7,000. Found in Noolpuzha, Kidanganad, Sultan's Battery, Purukkadi, Kottapadi, etc. They undertake *punam* cultivation as well as wet cultivation. Some of them wander as gatherers of edible herbs and roots. The rice varieties they cultivate are *Veliyan*, *Gandhakasala*, *Chennellu*, *Kuruva*, *Mallan punzha*, *Kalladi aryan*, *Thonnuran*, *Velumpala*, *Peruvaya andoor*, *Punnathan thondi*, *Navara*, *etc.*

(4) Kunduvadiyan

Population about 5,000. Found in Cheeyambam, Irulambam, Puthadi, Purakkadi, Pulpalli, Vythiri, etc. Their main

occupation is rice cultivation. The womenfork of Kunduvadiyan seldom work. The rice varieties they cultivate are *Veliyan*, *Chennellu*, *Cherumodan*, *Punnathan thondi*, *Modan*, *Thekkan cheera*, etc.

(5) Malayalar

Population about 200. Found in Malaya Kadu (Virpart Forest), Kizhpalli and Aralam. They were earlier *punam* cultivators but are now engaged in settled cultivation. Malayalars do not use cattle but the work is done with implements called *para* and *varool*. The rice varieties they cultivate are *Thonnuran*, *Gandhakasala*, *Pomathan palthondi*, *Punnathan thondi*, *Kottu thondi*, etc.

(6) Pathiyar

Population about 300. Found in Noolpuzha, Kidanganad, Vythiri, etc. They are settled cultivators in their own oruppu lands or in the agricultural fields of rich settlers from the plains. The rice varieties they cultivate are *Kuruva*, *Veliyan*, *Navara*, etc.

(7) Kader

Population about 300. Found in Thariode, Mangalasserry, Vellamunda, Mannanthoddy, etc. Their principal occupation is agriculture. Most of them have lease-hold land and cultivate rice, pepper and coffee. They are clever hunters also. The main rice varieties they cultivate are *Chennellu* and *Kuruva*.

(8) Karimpalan

Population about 6,000. Found in Thenkarachal, Padiyoor, Karoor, Vallikkal, Vengapally, Iyyad, Nediyanga, and Talipa-ramba. They are principally *punam* cultivators. In recent times a large number of Karimpalans have stopped cultivation due to the establishment of plantations and also because of encroachment of their land by the settlers from the plains. The rice varieties they cultivate are *Chennellu*, *Kottu thondi*, *Adakkan*, etc.

(9) Uridavan gowdalu

Population about 300. Found in Bairakuppa near the

Karnataka State boundary, Pulpalli and Vythiri. They are *modan* and *oruppu* cultivators of their own lands or lease-hold lands. They rear poultry and cattle also for trading. Ragi is their main food and usually all the rice they cultivate is sold. The rice varieties they cultivate are *Gandhakasala*, *Kuruva*, *Navara*, *Rajameni*, etc.

(10) Wynaadan chetty

Population about 500. Found in Sultan's Battery and near the border of Karnataka State. The Wynaadan Chettys cultivate wetlands and also raise *modan* crops. The rice varieties they cultivate are *Rajameni*, *Modan*, *Gandhakasala*, etc.

(11) Malakkaran

Population about 1,000. Found in Karakode, Puthiripadom, Manimooli, etc. They cultivate rice occasionally only, using any variety.

(12) Malavettuvan

Population about 3,500. Found in Prapoyil, Thirumani, Thadikadavu, Vayakkara, Thaliparamba, etc. They are only occasional cultivators.

(13) Urali kuruman

Population about 8,000. Found in Kalpetta, Purakkad, Kupathode, Chedeleth, and Kurichat Reserve Forests, Noolpuzha and Vythiri. Rice is cultivated by them rarely.

(14) Thachanadan

Population about 1,500. Found in Kunnempatta, Thoriyambeth, Kakavayal, Vythiri, etc. They are only occasional cultivators.

Malakkaran, Malavettuvan, Urali Kuruman and Thachanadan tribes, whose main occupation is not agriculture, are not fond of any particular rice variety for cultivation. They usually do not preserve any rice seeds for cultivation but procure the necessary quantity of seeds from others.

Apart from the 22 rice varieties mentioned above, collected from the tribals, four other varieties of Wynaad rices were also obtained from the Agricultural Research Station at Ambala-

vayal, Wynaad. These varieties are *AMBT-4*, *AMBT-5*, *Wynaad-1* and *Wynaad-2*. They were found recorded as collected from local tribals but no information is available regarding the tribes who were cultivating them. However, as these were distinct varieties, they were also included in the present study.

Classification of rice varieties in ancient Malabar

Ancient literatures show that rices were classified by the Malabar ayurvedics into two broad groups: (1) *Saali*, which are white rices, mainly grown in winter, and (2) *Vreehi*, which are red rices, mostly grown in rainy seasons. A subgroup of Vreehi is *Sashtikam*, which includes those varieties of red rices maturing in 60 days and usually grown in summer. A similar type of classification of rices is found in *Charaka Samhita* and *Susrutha Samhita*, the two treatises on Ayurveda and Medicine compiled in *ca.* 1st century A. D., where methods of uses of rice in the ayurvedic system of treatment are also given in detail cf: Cheriyakelan, 1873; Sukumaradev, 1976). *Saali* varieties are considered as good for daily consumption, excepting one of them, *Anduvila Chennellu*, which is supposed to increase *kapha* and *pitha* and, therefore, not good for regular use. Fresh seeds of all *Vreehi* varieties are considered as increasing *kapha* and *pitha* and, hence not recommended for daily use by the ayurvedics. Rice from at least six-month old paddy of these varieties alone are considered as good enough for daily consumption.

Some of the *Saali* and *Vreehi* varieties of rice, recorded in the ancient manuscripts in Malabar are listed as follows:

Saali varieties	*Vreehi varieties*
Vari nellu	*Navara*
Chennellu	*Karim kuruva*
Kalamappari	*Perunellu*
Neduvali	*Karinellu*
Velvali	*Ulimukathi*
Narikari	*Valanellu*
Erumappari	*Chitteni*
Varakan	*Modan*
Poovali	*Narunellu, etc.*
Thanavala, etc.	

Most of the rice varieties mentioned in the ancient literatures

are now either extinct or extremely rare, excepting two *Saali* varieties, *Chennellu* and *Chembavu*, and three *Vreehi* varieties—*Navara*, *Karim kuruva* and *Modan*. Among these, *Chennellu*, *Navara* and *Modan* are found to be still cultivated by the tribals of Malabar while *Chembavu* and *Karim kuruva* are cultivated by certain people in plains further south.

Screening of Malabar rices to find out the type of pbotosynthetic pathway in the different varieties among them

The leaf anatomy of all the rice varieties collected was studied to get an indication regarding the type of photosynthetic pathway in the plants. None of them were found to possess the *Krantz* leaf anatomy (cf: Chollet and Ogren, 1975), thereby showing that all these are normal C_3 varieties only.

Several biochemical distinctions between C_3 and C_4 plants are also known to exist, the important among them being the chlorophyll-a/chlorophyll-b ratio (Black, 1973), ratio of 3-phosphoglycolate phosphatase to phosphoglycolate phosphatase (Randall *et al.*, 1971), carbon dioxide compensation point (Krenzer, *et al.*, 1975), etc. In order to confirm the conclusion arrived at by the anatomical study, the chlorophyll-a/chlorophyll-b ratio in all the above rice varieties were determined and it was found that the highest ratio is 2.23. A detailed study about this aspect is in progress.

Discussion

In Malabar, which is an area comprising the four northern districts of Kerala, i.e., Cannanore, Calicut, Malappuram and Palghat, 48 primitive tribes are living. The principal occupation of 10 of these tribes is agriculture, while four other tribes are engaged in occasional cultivation. The agricultural tribes cultivate about 26 different primitive varieties of rice. Although new, improved varieties of rice are introduced in the locality, the tribal settlements show a preference to grow their own ancient varieties. They could not give any special reason for this preference but believe that their own varieties "would not let them down". This may be because the local varieties always give them some minimum returns due to their resistance to most of the common pathogenic organisms and pests, while the improved varieties may give them higher yield when the climatic

conditions are favourable but may result in complete loss of the entire crop under severe drought or when infected by disease or pests. For those who depend on the mercy of nature and have no ready access to modern plant protection methods, this "dependability" of the local varieties naturally appears as the greater attraction and the safer path.

The number of tribal settlements cultivating the ancient rice varieties as well as the number of the rice varieties being cultivated by them are getting diminished every year. The reasons for this may be many but the result is the disappearance of most of the ancient local rice varieties from this area.

Among the approximately 20 primitive local rice varieties of medicinal value mentioned in ancient ayurvedic literatures including *Charaka Samhita* and *Susrutha Samhita* of First century A. D., three varieties, namely *Chennellu*, *Modan* and *Navara* are found to be still cultivated by the tribals of Malabar. Seeds of these, along with the 23 other rice varieties cultivated by them are deposited in the Department of Botany, Calicut University, for maintenance.

Rice is one of the major crops which fixes carbon dioxide by the C_3 pathway. The induction of the desirable C_4 system in it could be more easily achieved through genetic engineering, if a C_4 variety of rice could be discovered. As varietal differences in photorespiratory rate have been reported in a few other plant species, an attempt was made to initiate a screening of the primitive rice varieties of our country by studying the gross leaf anatomy and the chlorophyll-a/chlorophyll-b ratio of the 26 Malabar varieties collected. Their leaves show typical C_3 type of anatomy. The highest chlorophyll-a/chlorophyll-b ratio in the varieties studied is found to be 2.23. Black (1973) reports that this ratio is 2.8 ± 0.4 in C_3 plants and 3.9 ± 0.6 in C_4 plants. Although it needs confirmation (further studies on this are in progress in this laboratory), the ratio of chlorophyll-a/chlorophyll-b in the rice varieties studied is well below that of even the ordinary C_3 types, which shows that there is much scope in inducing further photoinsensitivity in rice plants.

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22

FURTHER ETHNOBOTANICAL STUDY OF THE TODAS AND KOTAS OF THE NILGIRIS[1,2]

Z. Abraham[3]

ABSTRACT

A survey of sixty-nine plants in the lives of the Todas, the Kotas, and the Irulas of the Nilgiris was presented earlier (Abraham, 1981). In this article, further ethnobotanical study of the Todas and Kotas is presented. In addition to this, new uses gathered for several other plants and information obtained from a tribe other than the one from whom the folk-lore was obtained for the concerned species listed in the earlier publication are also given. Plant conservation measures in the form of sacred groves and sacred trees, practised by these tribes are also discussed.

The Nilgiris is the home of several tribal communities—the Todas, Kotas, Irulas, Kurumbas, Paniyas and Kattunayakas. The Todas are the earliest known inhabitants of the Nilgiris and are chiefly pastoral in nature. The Kotas are artisans and cultivators.

1. *This article is humbly dedicated to the memory of late Dr. E.K. Janaki Ammal, under whose guidance this work was carried out at University of Madras.*
2. *Paper presented at the "First Seminar on Recent Researches in Ethnobotany", held at Calicut University, Calicut, December, 1981.*
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A survey of sixty-nine plants in the lives of the Todas, Kotas and Irulas was presented earlier (Abraham, 1981). In this article, notes on thirty-three new plants in the lives of the Todas and Kotas are enumerated. In addition to the new plants, new uses gathered for several other plants and information obtained from a tribe other than the one from whom the folk-lore was obtained for the concerned species listed in the earlier publication are also included. Plant conservation measures practised by these tribes, in the form of sacred groves and sacred trees are also discussed.

The Todas of Kunthikodmand, Aganadmand, Manjakalmand and Lovedalemand and the Kotas of Sholur Kokkal were visited for this study as these tribal colonies were not studied previously. Voucher herbarium specimens were prepared for all the plants except for some common ones. The herbarium specimens are conserved in the Herbarium of South Indian Medicinal Plants, housed at the Madras University Botany Field Research Laboratory, Maduravoyal, Madras.

I. Enumeration of newly reported ethnobotanical plants

Plants are enumerated with their uses under the headings—medicinal plants, edible plants and miscellaneous plants for each tribe. Miscellaneous plants include chiefly plants associated with their cultural aspects. Names of plants in capital letters denote the tribal names of the plants discussed.

A. THE TODAS

(a) Edible plants

1. *Arundinaria wightiana* (Poaceae)—OTMULT
   Tender vegetative buds above the soil surface are edible.

2 *Elaeagnus conferta* (Elaeagnaceae)—PESHK-UM
Fruits are eaten.

3 *Syzygium densiflorum* (Myrtaceae)—KETH-UM
Fruits are delicious.

(b) Miscellaneous plants

1 *Aristida depressa* (Poaceae)—AFUL
Aerial portion is employed for thatching temples.

2 *Bambusa arundinacea* (Poaceae)—THEF
Culm is used in the construction of roof of temple and hut.

3 *Calamus pseudo-tenuis* (Arecaceae)—PET
Stem is employed in the construction of roof of hut and temple.

4 *Michelia nilagirica* (Magnoliaceae)—MORSHMAN
Tree is sacred and grown near temples.

5 *Ochlandra setigera* (Poaceae)—ODR
Culm is employed in the construction of roof of temple and hut.

6 *Pteridium acquilinum* (Polypodiaceae)—THAAV
Aerial portion is used as a cushion for buffaloes. This forms a very good natural manure along with buffalo dung. This manure is sold by this tribe to agriculturists.

7 *Rosa leschenaultiana* (Rosaceae)—KADUK
Flowers are ornamental.

8 *Rubus racemosus* (Rosaceae)—POOTHIMITSCH
Tender leaves are squeezed to extract water to quench thirst.

9 *Smilax aspera* (Liliaceae)—PALSCH
Twining stem is made into a ring and used with a stick in beating buttermilk.

B. THE KOTAS

(a) Medicinal plants

1 *Chenopodium ambrosoides* (Chenopodiaceae)—NAYIRI-CHOPPU
Leaves are employed as antiseptic.

2 *Oxalis corniculata* (Oxalidaceae)—PULLICHAL
Hot water extract of leaves with salt and pepper is used as a tonic for nursing mothers.

3 *Plantago erosa* (Plantaginaceae)—KAADAL-EL
A mixture of leaves and ghee is used to foment body.

4 *Solanum anguivi* (Solanaceae)—VADUTHANA
Fruit juice is used as antidote for snake-bite.

5 *S. viarum* (Solanaceae)—POOPACHIKAI
Fruit juice is used in the treatment of tooth-ache.

(b) Edible plants

1 *Annona squamosa* (Annonaceae)—SEETTA-PAN
Fruit is a delicacy.

2 *Arundinaria wightiana* (Poaceae)—ODA-KURUTHU
Sprouting vegetative shoots in the soil surface are edible. It is a rare delicacy during the early monsoon season.

3 *Elaeagnus conferta* (Elaeagnaceae)—PULU-VAN
Fruits are edible.

4 *Passiflora edulis* (Passifloraceae)—KORANG-KAAI
Fruits are edible.

5 *Rubus racemosus* (Rosaceae)—GANDMULI-PU
Fruits are edible.

6 *Spergula arvensis* (Caryophyllaceae)—THAADI-KEERAI
Young plants are extensively used as greens.

7 *Syzygium densiflorum* (Myrtaceae)—NERIL
Fruits are edible but not a delicacy.

8 *S. cumini* (Myrtaceae)—VEN NERIL & JAAB NERIL
These two are the local varieties of this plant. Fruits of both these varieties are edible and the trees are sacred.

(c) Miscellaneous plants

1 *Artemisia nilagirica* (Asteraceae)—KOY-KANUG
Dried stems with leaves are made into a torch to take it inside the temple for lighting.

2 *Cymbopogon flexuosus* (Poaceae)—PYKAGE-PUL
Whole plant is used for thatching purposes.

3 *Euphorbia rothiana* (Euphorbiaceae)—KUPUCH
Latex is spread over the young ones of buffaloes (the first issue) so that the mother buffalo licks it and can feed the young one.

4 *Ficus benzamina* (Moraceae)—THELA
This tree is sacred.

5 *Pteridium aquilinum* (Polypodiaceae)—THAAV
Aerial portion used as a cushion for cows.

6 *Ruta chalepensis* (Rutaceae)—ARUVATHA
A twig with flowers and leaves is placed in house to drive off evil spirits.

7 *Scutia myrtina* (Rhamnaceae)—SORRILLI MULLU
Whole plant is employed in fencing gardens.

8 *Sophora glauca* (Papilionaceae)—PEETHUR
Sticks with leaves are used as broom.

9 *Syzygium cumini* (Myrtaceae)—VEN NERIL & JAAB NERIL
Trees of these varieties are sacred and often found near temples.

II. New uses gathered for species listed in the earlier publication (Abraham, 1981)

1 *Argyreia nellygherya* (Convolvulaceae)
This species is known to the Kotas of the Sholur Kokkal as MENITHEL. Leaves used as plates in feasts.

2 *Berberis tinctoria* (Berberidaceae).
This species is known to the Kotas of Sholur Kokkal as THAK-PAN. Besides the edibility of the fruits, it was revealed that this plant is used for other purpose—the foliage is used for spreading cow-dung, to clean the house to ward off evil spirits.

3 *Centella asiatica* (Apiaceae)
It is known to the Kotas of Sholur Kokkal as KID-KOLAMBU. The leaf juice is used by this tribe to avoid vomitting sensation.

III. Information obtained from a tribe other than the one from whom the folk-lore was obtained for the concerned species in the earlier publication (Abraham, 1981)

1 *Carissa paucinervia* (Apocynaceae).
This species is known to the Kotas of Sholur Kokkal as KAL-VAN. Like the Todas, the Kotas also pickle the fruits.

2 *Hypericum mysurense* (Hypericaceae)

This plant is known as PALSE among the Kotas of Sholur Kokkal. They also use the bark for chewing.

3 *Physalis peruviana* (Solanaceae)

THUIR-VAN is the name attributed to this plant by the Kotas of Sholur Kokkal. They also eat the fruits.

4 *Ricinus communis* (Euphorbiaceae)

The Kotas in Sholur Kokkal term this as AMAND. Kotas also extract oil from the seeds.

5 *Rubus ellipticus* (Rosaceae)

This is termed as PENMULI-PU by the Kotas of Sholur Kokkal. They also eat its fruits.

IV. Sacred groves and sacred trees

The Todas grow *Michelia nilagirica* tree near their temples. They do not dare to cut this tree.

There are three sacred groves around Sholur Kokkal village. *Syzygium arnottianum*, *S. cumini* and *Ficus benzamina* are some of the trees of these groves. No tree is cut from here.

Trees of VEN NERIL and JAAB NERIL (*S. cumini*) are grown near the temples and are never cut. However, the fruits are eaten.

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23

PLANTS IN FOLK LIFE AND FOLKLORE IN ANDAMAN AND NICOBAR ISLANDS

N. Bhargava[1]

ABSTRACT

An introduction to the islands and a brief account of previous anthropological and ethnobotanical work have been given. This review article deals with the plants used by the Jarawa, Sentinelese, Onge, Great Andamanese, Nicobarese, Shompen, Burman (old settler) and the Indian (old settler) folks in their life and lore. Ethnobotanically, the Negrito aborigines of the Andaman Islands show certain similarities with the tribes of Thailand and Malaya.

Introduction

There are about 226 large and small islands with the total area of 8,293 sq km visible as peaks of a lofty range of submarine mountain stretching from Arakan Yoma in Burma to Sumatra in Indonesia, lying in the Bay of Bengal, between 13°41′ and 6°40′ N latitudes and 92°11′ and 94°10′ E longitudes The compactly arranged islands of the Andaman group are separated from the scattered islands of the Nicobar group by the deep ten degree channel. The climate of the islands is tropical, i.e., warm and humid. The mean temperature varies from 21° to 30° C. The annual rainfall is about 300 cm. The islands are subjected to the southwest monsoon from May to September and north-east monsoon from November to January. The soil is usualiy soft and deep sandy in the

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Andamans, while it is mostly of alluvial deposits and plutonic rocks in the Nicobars.

About 38 inhabited islands have a total population of about 150 thousand. The inhabitants of Andaman and Nicobar Islands can be mainly categorised as the Native Islanders and the Mainlanders. The native islanders may be either aborigines or settlers, also called 'Locals'. The aboriginal tribes constitute only 16 per cent of the total population. The rest of 84 per cent of the population is basically Indian mainlanders, comprising two major categories. Some have permanently settled here, while others (the majority) are in the services, either of the Andaman and Nicobar Administration or of different Central Government Departments.

The link language of Andaman and Nicobar Islands is Hindi. Besides tribal languages, Bengali, Malayalam, Tamil and Telugu are also spoken.

The word 'folk' can be defined as "people of a particular group or class with certain traditions, customs and beliefs which are handed down from generation to generation." According to the above criterion, the following eight groups of folk people in Andaman and Nicobar group of islands were selected for the present review. These are the natives of these islands or have become almost native with their original or mixed traditions handed down from generation to generation. Aborigines—The Jarawa, The Sentinelese, The Onge, The Great Andamanese, The Nicobarese, and The Shompen. Old Settlers—The Burman and The Indian.

Aborigines

The Jarawa, the Sentinelese, the Onge and the Great Andamanese belong to the Negrito race; while the Nicobarese and the Shompen taibes belong to the Mongoloid race.

The Jarawa: The Jarawas number about 250 and inhabit the western forest reserves of South and Middle Andamans. This tribe of Negrito race is still hostile but slowly progressing towards friendliness (Anonymous, 1979).

The Sentinelese: The Sentinelese number about 100 and inhabit the North Sentinel Island (*c.* 47 sq km area) in the southwest of Port Blair. This Negrito group of tribals is still hostile and almost secluded and isoloted from others.

The Onge: The Onge tribals numbering about a hundred are friendly, but their population has recorded considerable decrease. The Onges inhabit the little Andaman island (Pl. 23.1)

The Great Andamanese: The Great Andamanese originally comprised about 10 tribes and inhabited most of the Great Andamans. Their population was estimated for the first time as some thousands in 1779. According to a 1977 report (Dutta, 1978), there are only 23 survivors (14 males and 9 females) and are settled in the Strait Island, off the east coast of middle Andaman.

The Nicobarese: The Nicobarese are highly advanced in comparison to all other tribes. They live in large settled villages in the Nicobar group of islands. Only this tribe of the islands is flourishing well.

The Shompen: They inhabit the Great Nicobar Island, the southern most island of the Andaman archipelago. Their number is 92 and thus it is an endangered tribe. They are also semi-nomadic like other tribes of Negrito stock (except the Great Andamanese).

OLD SETTLERS

Old Settlers are those who came to Andamans prior to Independence and are known as 'Locals'. Old settlers can be broadly divided into following two sects:

The Burmans: Of Burmese origin.

The Indians: Of Indian mainland origin and as Hindi mixed with the words of other languages as a common link language.

Previous work

Significant anthropological studies on the tribes of Andaman and Nicobar Islands have been made by Mouat (1863), Man (1883), Portman (1899), Radcliffe-Brown (1948), Sarkar (1953), Chatterjee (1955), Nigam (1956 and 1962), Ganguli (1960, 1966 and 1976), Bose (1964), Kochar (1965 a, b and 1969), Cipriani (1966), Pandit (1969, 1976 a, b and c), Joshi (1975), Lal (1977) and Dutta (1978). Several unpublished reports or ethnologics are available for these islands.

Among the important floristic works on these islands mention can be made of Kurz (1870, 1876), Prain (1891, 1893),

Parkinson (1923), Sahni (1953) and Thothathri (1960 a, b, 1962).*

Work on the ethnobotany of the different tribes of Andaman and Nicobar islands is almost negligible. Out of the six tribes inhabiting these Islands, no ethnobotanical information is known about the Jarawa and the Sentinelese people, as they are still hostile. So far, either tourists or anthropologists like Kloss (1902), Cipriani (1966), Chak (1967), Singh (1975) have made some references to the plants used by the tribal folks. Parkinson (1923) refers to a few plant species used by the Andamanese (probably he meant Great Andamanese only). Thothathri (1966) described the use of *Orophea katschallica* during the process of honey collection by the Onges. Sangal (1971) described some tribal forest food. Chengappa (1953), Sahni (1953) and Joshi (1975) mentioned some plants used by the tribals. During botanical exploration tours to different islands, the present author has made many ethnobotanical observations on the folks of Andaman and Nicobar Islands.

Watt (1890), Parkinson (1923), Sahni (1953), Anonymous (1948-1972), Raghunathan (1976) and Zama (1976) made some references on the economic value and the utilisation of the plant species, found in the Andaman and Nicobar Islands.

Present work

The present article is based either on author's personal investigations or an earlier informations cited in publications or direct communication with Anthropologists. Allied Malaysian literature by Smitinand (1972), Tweedie (1953) and Van Steenis (1948-1954) was also consulted frequently during the study.

Plants used by the eight different folks of Andaman and Nicobar Islands are discussed under different headings. The name of folk using the plant species is indicated in parenthesis.

The following abbreviations are used in the text: A=Great Andamanese; B=Burmese; H=Hindi (The abbreviation 'H' is used for all old settlers, other than Burmese, as their link language is Hindi); J=Jarawa; N=Nicobarese; O=Onge; Sho=Shompen.

* A useful more recent work is by M.K.V. Rao (1986): A preliminary report the Angiosperms of Andaman Nicobar Islands. *J. Econ. Taxon. Bot.* 8: 107-184.

23.1 An Onge man in Andaman and Nicobar islands.

23.2 *Nipa fruticans* in nature—common thatching material among tribes of Andaman islands.

23.3 A place of evil spirits.

23.4 *Pandanus* trees—a favourite fruit of all tribes in Andamans.

23.5 Almost life-size wood carving with bright paints, represents ancestral spirits, usually kept in Nicobarese homes.

(1) Aesthetic sense

The tribal girls adorn their hairdo with flowers of *Crinum asiaticum* (O); *Gloriosa superba* (O) and *Melastoma malabathricum* (N).

The Old Settlers of villages decorate the breakfast table with the leaves of *Panax fruticosum*. They grow following species as hedge plants around their houses: *Clerodendron inerme; Duranta repens, Euphorbia antiquorum; Jatropha curcas; Lantana aculeata* and *Vitex trifolia*.

(2) Agriculture

The mainlanders cultivate rice, coconut, banana, pineapple, cashewnut and spices etc. The Nicobarese have developed some interest in the cultivation of coconut, banana, pineapple, artocarpus etc. They also take interest in *Pandanus* cultivation (Lal, 1977). The other tribes have not yet taken any interest in cultivation (Pl. 23.2, 23.3, 23.4).

As *Pandanus* fruit is a favourite food for most of the tribes, expansion of its cultivation can be encouraged.

(3) Arms and instruments

Arms: In these islands only the tribals use plant species for arms. The arms are bows and arrows which are essential for any primitive tribe, for protection and for hunting and fishing. The following plant species are commonly utilised:

Bows: *Manilkara littoralis* (O); *Sageraea elliptica* (A).

Bow-string: *Anodendron paniculatum* (A); *Ficus* sp. (O).

Arrows: *Ancistrocladus tectorius* (A); *Desmos dasymaschalus* (O).

The tips of the Onge arrows contain a pointed iron piece or a nail. The resin obtained from the *Canarium euphyllum* is used for making a substance for covering the binding of arrows by Great Andamanese (Parkinson, 1923). The Onge and the Great Andamanese use bows and arrows for hunting pigs. Besides hunting pigs, the Onges hunt fish also by bows and arrows.

The Jarawa and the Sentinelese also use bows and arrrows (Singh, 1975 and Pandit, 1976 b) mainly for their own protection. The plants used for this are not known. The Nicobarese of the Choura Island also use bows and arrows. Nothing is definitely known about the Shompen.

Instruments: The wood of *Diaspyros pilosula* is used by the Burman convicts for making axe handles.

(4) Art and craft

The Negrito folks do not have any specific inclination towards Art. However, the Nicobarese prepare life size statues of their ancestors from wood, and decorative pieces from dry coconut. The Old Settlers make different decorative pieces from the roots of mangrove species like *Rhizophora* spp. and *Bruguiera* sp. (Pl. 23.5).

(5) Beverages

The Onges prepare tea from the leaves of *Herritiera littoralis* and *Hibiscus tiliaceus*. Leaves of both species are taken in equal quantity and boiled in water to get an extract. Nowadays the Onges add a little salt to the extract known as tea.

The Nicobarese prepare a drink from the juice of stem of coconut tree. The Ranchiwallas prepare *Handia*.

(6) Boats

The Old Settlers from the mainland of India and the Nicobarese can make comparatively better boats from strippped wood pieces of *Artocarpus chama*, *Lagerstroemia hypoleuca*, *Podocarpus neriifolia* and *Sageraea elliptica*, etc. The Nicobarese boat is called *Odis*.

On the other hand the Burmese convicts, the Great Andamanese and the Onges prepare simple canoe from a single piece of a hollow tree trunk by removing the inner pith. Following species are commonly used: 1. *Calophyllum* sp. (O); 2. *Hopea odorata* (B); *Pajanelia rheedii* (A); 4. *Pterocynbium tinctorium* (O); 5. *Tetrameles nudiflora* (A).

The Jarawas do not have any knowledge of making dug-out canoes; therefore, they use only rafts (Pandit, 1976 b).

All the various stages of boat building such as the primitive raft, the dug-outs and the modern boats are seen among the tribes/folks of Andaman and Nicobar Islands.

(7) Fibre

While the Great Andamanese and the Nicobarese wear clothes, the Onges feel themselves uncomfortable in clothes.

The remarkable feature of the Onge woman is the use of 'Bul' made by gently pressing and crushing of vegetative shoots of *Calamus viminalis* to cover their genital parts (Pl. 23.6).

The frame of the cot is prepared from *Demos* sp., *Randia* sp., and netting is done by *Donax* sp. and *Calamus palustris*. The leaves of *Leea* sp. are used as bed-sheets. The Onge basket is prepared from *Donax cannaeformis* and umbrella from *Licuala peltata*.

(8) Food

Wheat and rice are the main staple food of the Old Settlers. During the second world war many Old Settlers had to hide from the Japanese invaders in the forests of near-by small isolated islands and they had to depend on wild foods. They took underground parts of Araceae, Dioscoreaceae, Zingiberaceae and aerial parts of several other families. Nowadays some of the tribal people have also developed taste and liking for wheat and rice. The Nicobarese and the Great Andamanese have already adopted many cultivated food items like wheat, rice, sugar, potato, etc., and are rapidly losing interest in forest food. Most of the Onges still continue to depend mainly on wild foods but are slowly shifting to the cultivated and imported foods. The Onges and the Shompens are also looking forward to the switchover. The Jarawas have just tasted coconuts, bananas, etc. The Sentinelese are still completely secluded from modern cultivated crops.

The Onges usually eat forest food in the raw condition. Sometimes they roast the food on fire or boil it. The Great Andamanese usually cook the forest food before eating The Nicobarese rarely eat forest food in the raw state. They cook it very well. Their process of cooking may employ frying with oil and addition of spices or sugar. Therefore, the Nicobarese are the most advanced in the methods employed in taking forest food, in comparison to other tribes of the islands.

As is seen from the following account, wild edible plants such as *Areca* species, *Artocarpus* species, *Cocos nucifera*, *Cycas rumphii*, *Pandanus* species are common among different tribes of Andaman and Nicobar Islands. The cooked fruits of *Cycas rumphii* are also eaten by the tribes of Thailand and Malaya (Smitinand, 1972). Moreover, the tribes of Andaman and

Nicobar Islands and Malayasian countries may eat poisonous fruits and seeds, but after some psocessing, such as cooking (i.e., roasting or boiling) on fire (Tanaka, 1976). So in some of the food habits, the tribes of Andaman and Nicobar Islands and Malayasian countries have certain similarities.

Eighty-three forest species used for food by different folks are given as follows. The name of the species is followed by part used and names of tribes using it (in parenthesis).

Abrus precatorius: Fruit and seed (O). Seeds are said to be poisonous.

Allophylus cobbe: Fruit (B).

Anacardium occidentale: Nut (B and H).

Anthocephalus chinensis: Fruit (B).

Areca catechu: Nut (A O, N, B and H).

Areca triandra: Nut. Favourite to the tribals for chewing (A, O, N, Sho, B and H).

Artocarpus communis: Fruit (O).

Artocarpus chama: Fruit (B).

Artocarpus integra: Fruit (B and H).

Artocarpus sp.: Fruit (O, N and Sho). *Artocarpus* species are favourite to the tribals.

Baccaurea ramiflora: Fruit (O, B and H).

Barringtonia asiatica: Seed (O). The seeds are poisonous,

Bombax insigne: Fruit (O).

Bouea oppositifolia: Fruit (B and H).

Bruguiera gymnorrhiza: Fruit (O).

Buchanania platyneura: Fruit (B).

Calamus viminalis: Fruit and pith of lower stem (H).

Carica papaya: Fruit (N, B and H).

Caryota mitis: Pithy core of stem (O).

Ceriops tagal: Fruit (O).

Champereia manillana: Leaves (B).

Cocos nucifera: Kernel (all folks except the Sentinelese). It's use by the Jarawa tribe is very recent.

Cycas rumphii: Seed (A; O and N).

Desmodium umbellatum: Fruit (O).

Dioscorea glabra: Roots and tuber (A, O; J, N and Sho). *Dioscorea* species are suspected to cause sterility among the Onge tribe.

Dioscorea pentaphylla: Roots and tuber (A, O, J, N and Sho).

Dolichandrone rheedii: Flower and young fruit (B).
Dracaena angustifolia: Fruit (O).
Dracontomelum mangiferum: Fruit (O, N and B).
Durio zibethinus: Fruit (B).
Ehretia laevis: Fruit (B).
Elaegnus latifolia: Fruit (B).
Emblica officinalis: Fruit (B and H).
Entada pursaetha: Kernel (A).
Eria andamanica: Pseudobulb (O).
Erioglossum rubiginosum: Fruit (B).
Eugenia javanica: Fruit (H).
Eugenia kurzii var. *andamanica:* Fruit (B and H).
Ficus hispida: Figs (O).
Ficus racemosa: Figs (B and H).
Ficus rumphii: Figs (B).
Flagellaria indica: Stem and fruit (O).
Garcinia cowa: Fruit (B).
Garcinia xanthochymus: Fruit (B).
Garuga pinnata: Fruit (O).
Glycosmis pentaphyalla: Fruit (B).
Hemicyclia andamanica: Fruit (H).
Heritiera littoralis: Leaves and seed (O).
Hibiscus tiliaceus: Leaves (O).
Leea indica: Leaves (B).
Mangifera indica: Fruit (B and H).
Mangifera sylvatica: Fruit (B and H).
Manilkara littoralis: Flower (A); Fruit (O).
Mesua ferrea: Fruit (B).
Morinda citrifolia: Leaves (N and Sho).
Moringa oleifera: Leaves, flower and fruit (B and H).
Mucuna monosperma: Seed (B).
Musa sapientum: Fruit (A, N, B and H).
Nipa fruticans: Fruit (N).
Ochrosia oppositifolia: Seed (N).
Oroxyllum indicum: Fruit (B).
Pandanus leram: Fruit (A, O, N and Sho). Pandanus is also a delicious fruit for the tribals. Sometimes sweets are also prepared by the Nicobarese tribals.
Pisonia umbellifera: Tender growing tips (Sho).
Planchonella longepetiolatum: Fish and pork baked in large

leaves of young plants (A).
Pongamia pinnata: Seed (O).
Psidium guayava: Fruit (H).
Sandoricum indicum: Fruit (N).
Sapium baccatum: Fruit (B).
Selaginella sp.: Roots (Sho).
Solanum verbascifolium: Fruit (B).
Spondias pinnata: Fruit (N, B and H). Burmans also use leaves.
Sterculia spp.: Fruit (N).
Streblus asper: Fruit (B).
Syzygium spp.: Fruit (N).
Terminalia bialata: Kernel (A); Seed (B).
Terminalia catappa: Kernel (O, B and H).
Thespesia populnea: Leaves (Sho).
Trichosanthes bracteata: Fruit (O).
Vitis spp.: Fruit (H).
Wrightia tomentosa: Leaves (B).
Ximenia americana: Fruit (B).
Zanthoxylum budrunga: Leaves (B).
Zizyphus mauritiana: Fruit (B and H).

(9) Industries

The tribals have no industries. The locals have developed some cottage industries of timber. They prepare carvings on drift roots of mangrove species. Industries based on rubber and coconut are being planned for the future.

(10) Shelter

Mainlanders were the first to construct well designed wooden houses. Now, many of the Nicobarese live in wooden houses of modern designs. They are now discarding their old designed huts, Recently, the Onges have also started to demand modern houses for themselves from the Administration. Parkinson (1923) and Zama (1976) have described some timber species of the Andamans.

The huts of the Nicobarese and the Onges are semi-circular in shape (Pl. 23.7, 23.8). The Nicobarese huts are constructed on pillars and raised above the ground, while the Onge huts are constructed directly on the ground. The circular dom-

shaped hut is helpful in resisting high wind velocity. *Calamus palustris*, *Desmos dasymaschalus*, *Garcinia* sp. and *Randia* sp., etc., are used in construction of the framework of the hut. Thatching material for the roof is obtained from the leaves of *Nipa fruticans*, *Cocos nucifera*, *Calamus* spp., *Pandanus* spp., etc. The Shompen huts are rectangular and are propped on stilts of four to six metres above the ground.

(11) Medicine

Some common plants used by the different folks as medicine are given below:

Body pains: *Adenia penangiana* (N); *Donax cannaeformis* (O)
Cough: *Premna serratifolia* (O); *Scaevola koenigii* (O)
Cuts and wounds: *Morinda citrifolia* (N); *Wedelia biflora* (O)
Fever: *Desmodium umbellatum* (O)
Gynaecological disorders: *Donax cannaeformis* (O)
Headache: *Hernandia peltata* (N) *Ipomoea pes-caprae* (N); *Scaevola sericea* (O); *Wedelia biflora* (N)
Insect repellent: *Canarium euphyllum* (A and O); *Casuarina equisetifolia* (H); *Cocos nucifera* (O); *Orophea katschallica* (O); *Vitex trifolia* (H).
Miscellaneous medicinal use: *Thespesia populnea* (O)
Stomach pains and disorders: *Aegie marmelos* (H); *Donax cannaeformis* (O); *Macaranga peltata* (O); *Morinda citrifolia* (N)
Plants in veterinary medicine: *Ficus hispida* (N)

As regards mode of preparation of prescriptions the Old Settlers are more advanced. They prepare some sort of petty Ayurvedic medicines. Most of the tribals use plant parts in the raw form as medicine.

(12) Music and dance

The Nicobarese use leaves of *Leea* for making music during their dances.

(13) Narcotics

The following plants are used: 1. *Grewia microcos*. The leaves are used by the Burmese to make Cigars; 2. *Streblus asper*. The wood is cut into small pieces and mixed with tobacco for making the Burmese cheroot.

(14) Religion and worship

The following plants are associated with worship on are grown near the places of worship:

Caryota mitis: The leaves are used by the Old Settlers in the preparation of garlands and for decoration in Hindu or Buddhist religious ceremonies.

Ficus religiosa: It is planted near Hindu temples and Buddhist pagodas.

Leea sp.: The Nicobarese use leaves during the worship of evil spirits.

Melastoma malabathricum: The flowers are used by the Old Settlers during Hindu ceremonies/prayers.

Plumeria acuminata: In the Andamans it is often planted near the temples or pagodas.

Randia sp.: The flowers are large and used during Hindu prayers.

(15) Source of water

Calamus andamanicus: About 3 metres long sections of the stem are cut and held vertically to yield sap. This plant was used by the Great Andamanese and Old Settlers during the Second World War.

Zingiber squarrosum: When the Onge tribals feel thirsty they chew the petioles.

(16) Utensils

The following plants are used by different folks:

Anthocephalus chinensis: The Shompens make boat-shaped vessels from the bark for boiling *Pandanus* fruits.

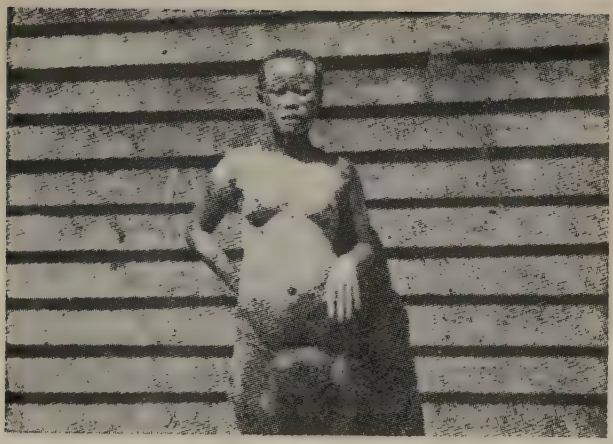
Areca sp : The Shompens use the spathes for storing and drinking water.

Macaranga indica: The large leaves are used by the Old Settlers for keeping eatables and wrapping up of articles.

Macaranga nicobarica: The Nicobarese use its large leaves as plates and saucers for serving food.

Macaranga tanarius: The large leaves are used by the Old Settlers for wrapping of articles.

Pajanelia longifolia: The Onges prepare buckets from hollow tree trunks for keeping honey combs during the collection of honey.



23.6 An Onge woman wearing 'bul' made of *Calamus viminalis* and with traditional 'Ochre' paste decoration at the face.

23.7 A Nicobarese hut.

23.8 An Onge hut

Planchonella longepetiolatum: The Great Andamanese bake fish and pork in large leaves of young plants.

Trema amboinensis: The Shompens make boat-shaped vessels from bark for boiling *Pandanus* fruits.

Conclusion

From the ethnobotanical point of view, the Jarawa and the Sentinelese tribes are almost unexplored.

The Great Andamanese, the Nicobarese and the Shompens have certain ethnobotanical similarities in their food habits, huts, medicinal uses, etc. These negrito tribes have some similarities with the tribes of Thailand and Malaya.

On the basis of ethnobotanical studies on food habits, utilisation of plant fibres, construction of huts, use of bows and arrows, canoes, out of all known friendly tribes of Andaman and Nicobar Islands, the Onge can be designated as among the most primitive tribes. The Nicobarese are the most advanced tribals of these islands. The wide use of local flora by the tribal people suggests that cultivation and conservation of indigenous useful plants should be encouraged. There is a need of intensive work in this direction which may help tribal development.

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24

STUDIES IN ETHNOBOTANY OF THE KARBIS (MIKIRS); PLANT MASTICATORIES AND DYESTUFFS

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ABSTRACT

This article deals with first-hand information on masticatories and dyestuff used by the Karbis. Out of the twelve plants reported to be used by the people as masticatories, four are not known for such use in literature. These are *Caryota urens, Livistona jenkinsiana, Pinanga gracilis* and *Walsura robusta.* Twelve plants are used for dyeing cloth and yarn. Out of these, five plants were not known earlier for such use. These are *Aporusa octandra, Baccaurea ramiflora, Indigofera dosua, Smilax ocreata* and *Turpinia nepalensis*.

Introduction

The Karbis are a semi-nomadic hill tribe of Assam. They call themselves *Arleng*, which in their dialect means *man.* The Karbi-Anglong district (till recently called Mikir Hills), is their land. The district is largely mountainous surrounded by Meghalaya, North-Cachar hills (Assam) and Nagaland on its southern and western boundaries and the plains of Nowgong and the Sibsagar districts of Assam on its northern and eastern boundaries.

Till recent, the area had remained almost unexplored botanically. A scrutiny of the entire material in the Central National Herbarium (CAL) comprising about 1.5 million specimens, showed only about 200 specimens from the Makir Hills. A similar scrutiny was made in the herbarium at Shillong

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(ASSAM), where all collections of Kanjilal and others from the area are housed; the collections from the Mikir Hills total less than one thousand specimens.

In a recent ethnobotanical study among the Karbis, observations on various aspects in which plants are used by the tribe were made. The present article deals with first hand information on two aspects of tribal uses of plants in the area. viz., masticatories and dyestuffs.

MASTICATORIES

Substances which are chewed and sucked for some psychological, satisfaction are regarded as masticatories (Faulks, 1958). Such a practice has two effects, firstly, the sucking and chewing is comforting, and satisfying, and secondly, the substances extracted during the process of chewing have a psychological effect which gives rise to a feeling of well-being, either by stimulation or narcosis.

The practice of chewing certain plant products is widespread (Gowda, 1950). Chewing of *Areca catechu* (Arecanut, Betelnut) is common not only in India but also in Burma, Ceylon and Malaya. It is used either raw or cured. Three varieties of cured nuts, viz., *betlu* (slices), *choora* (pieces) and *idi* (whole) are sold in the market. Generally, *Arecanuts* are chewed along with leaves of *Piper betle* (Betel) and a littel slaked lime, to which *katha* prepared from *Acacia catechu* and certain spices, and tobacco are sometimes added. Readymade chewing preparations like these, called *Beedas* are sold in the market.

Spices like *Elettaria cardamomum* (Cardamom), *Foeniculum vulgare* (Fennel), *Syzygium aromaticum* (Clove) and *Trachyspermum ammi* (Carum, *Ajowan*) are generally added to the *Beedas*. Sometimes these spices are used as masticatories either singly or in varying mixture, or with coconut shavings. Similarly, fruits of *Terminalia bellirica*, *T. chebula* and *Emblica officinale* are often used as masticatories.

The Karbis use a dozen species of plants as masticatories. The use of these plants largely depends upon the occurrence and availability in the nearby forests. Sometimes in one locality four-fifths of the plants are simultaneously used, whereas in other localities many species are available, yet only one is more commonly

used. This depends on personal preference. Some plants mentioned above viz., *Terminalia bellirica*, *T. chebula*, and *Emblica officinale*, though occurring wild in the area have very rarely been seen to be used for this purpose. Of course, nowadays, *Areca catechu* and *Piper betle* are sometimes cultivated.

The parts of the plant used of masticatories are taken either fresh or in dried form This depends upon the kinds of plants used. The usual practice in all cases is to chew with leaves of *Piper longum* which is found abundantly in the area, along with a little slaked lime and tobacco. In many cases, the author has seen that even fresh leaves of *Nicotiana tobacum* (which they cultivate in their *jhum* fields) are used for this purpose without any processing. The lime for this purpose is prepared by burning the shells of a kind of mollusc available within the area.

For each species, the botanical name, local name, and the use are mentioned. Botanical description are not given as they are available for most of the species in *Flora of Assam* (Kanjilal *et al.*, 1934-40).

Artocarpus lakoocha (Ingtat-araung)
Bark is used either fresh or dried.

Callicarpa arborea (Arhi-araung)
Dried bark is used.

**Caryota urens (Chang-kraum)*
Fresh nut is used. The dry nuts become stony.

Choerospondias axillaris (Theseli-araung)
Dry bark is used. Fresh bark contains latex which is acrid.

Combretum roxburghii (Arkeng-rikang)
Fresh bark is used.

Dalbergia pinnata (Subin-rikang)
Dry bark is used.

Derris elliptica (Hiru-rikang)
Fresh bark is used.

Horsfieldia kingii (Mijingi-kum-asing-araung)
Fresh kernel is used.

**Livistona jenkinsiana (Takau-araung)*
Dry nuts become stony.

**Pinanga gracilis (Turaung-araung)*
Nut is used fresh or dried.

Saraca asoca (Mirkrem-araung)
Cotyledon is used fresh or dried.

**Walsura robusta (Arkeng-alau, Arpi-haue-wai, Theng-rali)*
Bark is used fresh or dried.

The above uses were recorded during fieldwork. Out of the total 12 plants, four (with asterisks) are not recorded in literature as masticatories (Anonymous 1948-76). However, the rest also, though mentioned in literature, are in limited use and not well-exploited commercially in this area. It was found that *Artocarpus lakoocha*, *Combretum roxburghii*, *Pinanga gracilis*, *Saraca asoca* and *Walsura robusta* are largely used by the people and also occur abundantly in the area.

DYESTUFFS

Substances which impart colour or fix calour or help in the fixation of colour are regarded as dyestuffs mordants. Plant dyes are still used to a considerable extent all over the world though their use has decreased greatly with the introduction of synthetic dyes. Many advanced countries have banned the use of syntheic dyes in foodstuffs and are spending huge amounts on research in natural dyes.

In the present article, those plants are mentioned which are used by the Karbis during the process of dyeing their yarn or cloth.

Handloom weaving is the only important indigenous industry among the Karbis. Weaving is done with traditional lion looms.

The raw materials, cotton and silk for this industry, are produced locally. Along with other crops, they cultivate *Gossypium herbaceum* and *Ricinus communis* for rearing Endi. The method of cultivation is still *jhuming*.

Either the yarn (before weaving) or the cloth (after weaving) are dyed to make colourful garments. They use a large number

of plant parts for this purpose. Specific use of these plants depends upon the kind and quality of the cloth produced.

The method of extraction of these colouring matters is very simple. In many cases an especially made alkali solution called *Phalo* is used. It is prepared from *Musa balbisiana.* The leaf-sheaths are peeled off and dried under the sun. These are then burnt and the ash is mixed with water. The residue is separated with a sieve and the solution is used for this purpose.

This once progressive home-art for domestic consumption is now showing signs of decay under urban impact. In many localities people now depend upon the market for supply of their yarn and even readymade garments. Cotton and endi cocoons produced locally have slowly entered into their market and trade economy, rather then ramaining confined to subsistence purpose only. But many culturally conscious or economically handicapped families, still maintain their traditional customs and depend upon the home-produced garments.

For each species, the botanical name, local name and the use are mentioned.

**Aporosa octandra (Tamsir-araung)*

Fresh leaves crushed, mixed with water and kept for two to three days. The residue sieved out and to this filtrate an alkali solution mixed. Yarn or cloth dipped for two to three hours. The process repeated two or three times, each time drying the yarn or cloth before dipping. In imparts a permanent black colour.

**Baccaurea ramiflora (Dampiya-araung, Tampaiuk-araung)*

Lac boiled in water, some macerated bark added. Sometimes, leaves also used. The cloth or yarn dipped in this mixture and kept for one day. It imparts a chocolate colour. For deep colour, the cloth put in solution once again after drying.

Baphicanthus cusia (Bukangda, Bukangku, Sibu)

Fresh leaves used. It yields a deep blue colour. The process is same as for *Aporosa dioica.*

Bischofia javanica (Phang-araung, Phang-put-araung)

Generally fresh bark used, rarely leaves also used. It yields

a pink-red colour. The method of extraction same as for *Aporosa dioica.*

Garuga pinnata (Tejhi-araung, Timur-araung)

Fresh bark used. It yields a black colour; method same as for *Aporosa dioica.*

**Indigofera dosua (Bujir, Buthi, Duli)*

Fresh leaves used. It yields a deep blue colour, process same as for *Aporosa dioica.*

Maclura cochinchinensis (Baupau-chuni-araung)

Generally chips of wood used, rarely macerated bark also used. Colouring matter extracted by boiling chips of wood or bark. To this extract an alkali solution added. It yields a yellow dye.

Morinda angustifolia (Kaunthu-araung)

Roots used. They yield a yellow dye. The process same as for *Maclura Cochinchinensis.*

Oroxylum indicum (Napak-ban-araung)

Bark and immature fruits used. They yield a black colour. The method similar to *Aporusa octandra.*

Pithecellobium angulatum (Theng-semai-araung)

Fresh leaves boiled with fresh fruits of *Terminalia chebula* or *Terminalia citrina* to extract the colouring matter. Sometimes bark instead of fruits of *Terminalia chebula* or *T. citrina* used. It yields a black dye.

**Smilax ocreata (Philangtung-rikang)*

Fresh fruits used at the stage when they become yellow. They yield a yellow dye. The process same as for *Maclura cochinchinensis.*

**Turpinia nepalensis (Thekejauai-araung, Khrang-araung)*

Unripe fruits used. They yield a black calour. The process of extraction same as for *Aporosa dioica.*

Out of the 12 plants discussed for their use as dyestuffs and mordants, five (with asterisk) are not recorded in literature (Anonymous 1948-1976). The details of extraction of the colouring matters were observed during author's own stay and study in the area. Some plants such as, *Baphicanthus cusia* and *Indigofera*

dosua are usually cultivated for this purpose, though in some localities they are found as escape. Rest are generally collected from the nearby forests.

Discussion

Phytochemists could consider analysing these species for their constituents. This may enable commercial exploitation of these materials. On the other hand, some plants which are long known for their medicinal properties and also used as masticatories in other parts of the country, viz , *Terminalia bellirica*, *T. chebula* and *Emblica officinalis* are occurring abundantly in this region. Till now, these are also not known to be exploited commercially in this area.

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25

PLANTS USED IN TREATMENT OF CATTLE AND BIRDS AMONG TRIBALS OF EASTERN INDIA

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ABSTRACT

The author is engaged in ethnobotanical studies in parts of eastern India. Fieldwork was done among the Mundas, Orans, Santhals, Lodhas, Kondhs, Bhumijs, Hos and Mechs of Bihar, Orissa and West Bengal.

The indigenous plants used by the Adivasis for food and medicine were particularly studied. The present article deals with some medicinal plants, viz., *Argyreia nervosa, Cassia fistula, Curculigo orchioides, Cyanotis tuberosa, Thelypteris extensa, Dendropthoe falcata, Entada pursaetha, Euphorbia thymifolia, Glossogyne bidens, Semecarpus anacardium, Smilax zeylanica, Soymida febrifuga*, etc. observed in the area of study. Twenty-five species used in the treatment of domestic animals (cattle and birds) are discussed; these belong to 18 families and 25 genera of angiosperms and pteridophytes. The botanical name, habit, local names, probability of the origin of some local names and tribal medicinal uses are given.

These uses are unique to the tribal community.

Introduction

In India, the history of medicine can be traced back to the Vedic period. But there is no mention or little mention of plants in the treatment of domestic animals (cattle and birds).

However, it is not clearly known when and how the plants came into usage to cure the animals from different ailments. It can be assumed that the use of medicinal plants in the treatment of domestic animals started when the animal power was used in cultivation. But there is no authentic evidence about it.

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During ethnobotanical studies among Mundas, Orans, Santhals, Lodhas, Kondhs, Bhumijs, Hos and Mechs in the States of Bihar, Orissa and West Bengal, the author came across a number of plants used singly or in mixture in the treatment of domestic animals.

It is seen that the empiric knowledge about vast resources of herbs and other plants having curative properties is prevailing in remote areas in the country. There is little record of this unique knowledge. So it is important that it is recorded. The present article is based on the materials and information gathered by the author in the field. The information reported by the tribal people was compared with published literature on Indian ethnobotany and it was found that most of the uses are not reported earlier.

The region of work (Bihar, Orissa and West Bengal) is covered by the botanical works of Haines (1921-25) and Prain (1903).

The method of field work followed in these studies is same as adopted by Jain (1965). The remote forest areas were visited. The local tribal medicinemen or elderly people accompanied us for field work. Plants and their uses were discussed in the forest and also in the camp. The plants are known by their local names mainly on the basis of shape, colour, medicinal properties, etc. The collected specimens were preserved with notes on locality of collection and information on uses.

The specimens are deposited in the ethnobotanical herbarium and museum of the Central Botanical Laboratory, Botanical Survey of India, Howrah for future reference and study.

The purpose of the article is not to prescribe remedies for diseases of domestic animals but to draw attention of plant chemists and pharmacologists to these reports for further scientific study.

The species are arranged alphabetically by their botanical names which is followed by local names, probability of the origin of some local names and uses as reported by the tribals. In some paragraphs, in addition to the main species, some other plants used as substitute or supplementary materials are also mentioned particularly for purposes of comparison with other plant groups.

The Mundas use Mundari and Santhals the Santhali language. The Orans, Lodhas, Bhumijs and Hos use mixed Mundari. The Kondh use a special dialect Kui having Dravidian origin. But Mech use mixed Bengali and Bhutia having Mongoloid origin.

The abbreviations used in this arricle are as follows: K = Kui; O = Oran; M = Munda; S = Santhal; Lo = Lodha; B = Bhumij; H = Ho; Mec = Mech.

Annona squamosa

Mondal (S): Occurs throughout India.

If the bull is injured by the blade of plough, the injured portion is bandaged with the leaves of this plant to cure the wound.

The seeds of this plant are pounded with the cake of *Mahul* (*Madhuca longifolia*) and the pounded mixture is applied on the body of the cattle and birds to remove lice or other external parasitic insects from the body.

The leaves of *Mehdhi* (*Lawsonia inermis*) are made into a paste with the leaves of tobacco (*Nicotiana tabacum*) and used as insecticide in case of domestic animals.

Jain and De (1966) have reported from Purulia, West Bengal, that the crushed roots of *Schrebera swietenioides* are applied to kill worms in cattle.

Haines reports that the leaves of *A. squamosa* are an insecticide. In *Wealth of India* (Anonymous 1948-76), it is reported that the unripe fruit, seed, leaf and the root are used for destroying insect and lice.

Chopra *et al.* (1956) record no such uses of the leaves but report that seeds are a potent insecticide. In 1969 they have mentioned that the green leaves yield pleasant essential oil (0.08 per cent).

Argyreia nervosa

Bara-dudhi (Lo); *Marang-har-lu* (O): Occurs throughout India.

As there is latex in the plant body and the plant is stout and woody, so the term *Bara-dudhi* has been applied to this plant.

About 25 gm roots are pounded with 5 gm seeds of *Jawain* (*Trachyspermum ammi*), 150 gm of *Masur* (*Lens culinaris*) and 150 gm of molasses. The pounded mixture is given orally for lactation of cattle.

The fresh rhizome of *Kal-Halda* (*Curcuma caesia*) is pounded and is prescribed orally by the Lodhas to cattle for more milk.

Chopra *et al.* (1956) report that the root of the plant has some effect on nervous system.

Atylosia scarabaeoides

Gaisani-Lohara (H), *Ban-Kulthia* (K): Occurs throughout India up to 1660 m.

Most of the tribal people called the plant *Ban-Kulthia* because it looks like *Kulthi (Dolichos biflorus)* and grows wild. The tribals like Oran, Munda, Ho, Bhumij and Lodhas called the plant *Gaisani-Lohara*, but the Santhals called it *Birhorce*. The term *Lohara* is commonly used for twining plants.

The decoction of the aerial parts of the plant and the seeds of *Dolichos biflorus* is prescribed orally by the Mundaric groups of tribes in dysentery of cattle. The decoction is generally given in morning.

Jain and De reported that the decoction of the leaves is given in dysentery of the cattle.

Haines states that the plant is given to cattle in diarrhoea.

Chopra *et al.* (1956) report that the plant is used for diarrhoea in cattle but they quote no work on chemical analysis of this plant.

Calotropis gigantea

Akond (B): Occurs throughout India; there are purple flowered plants and white flowered plants.

The heated leaves are applied on any swellings of the legs of cattle.

Jain and De have stated that warmed leaves are applied on swollen checks in Sannipat diseases of cattle. The root is given with *Telmara* (a herbal preparation) in this particular Sannipat disease of cattle.

Chopra *et al.* (1956, 1969) report no such uses of the leaves but have stated that root has been used on elephantiasis.

Cassia fistula

Marju-baha (O), *Bara Chakunda* (Lo): Occurs throughout India.

Most of the tribes called the plant *Bara-Chakunda* or *Sonari*. But the Santhal, Ho and Munda called it as *Mirju-Baha*. The term *Baha* refers to flowers by the tribals. *Cassia occidentalis*

is generally known as *Chakunda*. As the fruits of *Cassia fistula* are long and the plant is a tree, so the term *Bara-Chakunda* has been used for this plant.

Two to three roots of the plant and half black pepper (*Piper nigrum*) are made into a paste with small amount of red mud and the juice of six leaves of *Katal* (*Artocarpus heterophyllus*). The mixture is applied to the cattle for giving relief to swelling of throat.

Mundas give the pulp of the fruit to cattle as laxative.

Jain and De reported that the heated fruits are applied on the neck of the cattle to cure swelling due to cold.

Chopra *et al.* (1956) report that the root of the plant is good as a purgative. They also state (1969) that the pulp and seed extract have antibacterial activity.

Crotalaria linifolia

Korsa (S): Grows throughout India.

The plant is pounded with common salt and is applied externally to wounds in cattle to remove the maggot from wounds.

Curculigo orchioides

Tar-Muli (H, M, S): Occurs in sub-tropical Himalayas from Kumaon eastwards.

As the plant looks like the seedling of *Tar* (*Borassus flabellifer*), that is possibly the reason the term *Tar-muli* has been applied to this plant.

When cattle are suffering from eye diseases (watering) the juice of the tuber is put as an eye drop.

Cyanotis tuberosa

Bong-gasum (K), *Jeeng-arok* (S): Occurs in Chotanagpur and in the Deccan Peninsula.

The term *Arok* is applicable to all edible wild herbs. The Santhals eat the tubers and the plants. So the name *Arok* has been given to this plant.

The Lodhas of West Bengal use the pounded tubers orally with common salt to cure the fever of cattle. In Haines it is mentioned that the tuber is given in prolonged fever and also for worms. In *Wealth of India* and in Chopra *et al.* (1956) the sams uses as above have been mentioned.

Dendrophthoe falcata

Manda (S, M, K, H, O, Lo): Occurs throughout India.

Any parasitic plant is called *Manda* by the tribes like Lodha, Oran, Munda, Ho, etc., and *Sum* by the Santhals. But the Gond and others called the parasite *Banda.*

The specific name of the parasite is derived from the names of the host plant as *Kuchila-Manda*, *Kuchi.a-Sum* and *Kuchila-Banda* when the parasite grows on the branches of *Strychnos nux-vomica.*

The Lodhas called the tuberous portion at the junction of the host and parasite as *Atkura.* There is a belief among the Lodhas that if anybody keeps the tuberous portion in a cow-shed due to enmity, the cow will not produce any calf, similarly the hen will not give eggs.

Begna-Manda, i.e., a parasite on *Vitex negundo* is more effective than *Kuchila-Manda.*

Jain and De reported that if a piece of the stem of *Sindhar-Banda (Loranthus philippensis)* is tied to the body of a cow, it causes infertility. So tribals do not allow the twigs of this plant to be brought into their village.

Due to growth of this parasite, the fruit production of plant is reduced. Sometimes plants also become barren. So it may be symbolic to cattle and domestic birds. The tribal people therefore avoid the plant.

Chopra *et al.* (1956) state that the bark of the plant is an astringent and narcotic. Kirtikar and Basu (1935) report that the bark is used on wounds, in menstrual troubles and as a remedy of mania.

Drynaria quercifolia

Diukea-Banda (O, K, H), *Garur-Panki* (M): Occurs throughout India.

The sterile frond of the fern looks like the wings of a bird. So possibly the term *Garur-Panki* has been applied to this plant by the tribals. The term *Banda* is given to any epiphytic plant.

The rhizome of the plant, three internodes of *Har-jor (Cissus quadrangularis)* and 100 gm of *Zingiber officinale* are pounded. The pounded mixture is applied on bone fracture in cattle. If necessary, two or three strips of bamboo are placed around the

fractured part and tied with a piece of cloth. The treatment is continued for 15 days.

The barks of *Kumvi (Careya arborea)*, *Mahul (Madhuca longifolia)*, one piece of *Cissus quadrangularis* plant and few aerial root tips of *Pakur (Ficus bengalensis)* are made into a paste and applied on bone fracture in cattle. It is bandaged with the leaves of 'Sehari' (*Bauhinia vahlii*) and is tied with the bark of the same plant.

In *Wealth of India*, it is mentioned that the aqueous extract of the rhizome of *D. quercifolia* possesses antibacterial properties. Chopra *et al.* (1956) report that the rhizome is a bitter astringent.

Eclipta alba

Hatu-Kesari (S, M, H, O): Occurs in moist situations throughout India.

The leaf juice of the plant is generally used for promoting hair-growth; so possibly that is why the name *Kesari* has been given to this plant.

The pounded roots are applied externally with the oil of *Kusum (Carthamus tinctorius)* as an antiseptic to cure ulcers and wounds in cattle.

Jain and De have reported that the leaf juice is applied to cure sores on the shoulders caused by carrying heavy loads; also used in swelling of the ears of cattle.

In *Wealth of India* it is reported that the root of the plant is antiseptic to ulcer and wound.

Dhar *et al.* (1968) reported that the alcoholic extract of the plant has antiviral activity against *Ranikhet* disease virus. *Ranikhet* disease virus causes serious damage in domestic birds particularly in hens So clinical trial can be taken up.

Entada pursaetha

Gar-Karla (L): Occurs in Central and Eastern Himalayas, Sikkim, Bihar, Orissa and the Ghat forests of Maharashtra.

The cotyledon of the seed is made into a paste with the ashes of *Polyporus* fungus (Bracket fungus) which grows on the bark of living *Sal* tree *(Shorea robusta)*. The paste is applied twice daily on swelling of the throat in cattle. The paste is also prescribed orally to check serious diarrhoea of the cattle.

Lodhas apply the juice of the leaf of *Maha-Karat (Agave sisalana)* on the inflammation of the cattles' throat.

The term 'Maha-Karat' has been applied to this plant as the leaf of the plants looks like sawblade.

In *Wealth of India* it is stated that a paste prepared from the seeds is applied locally for inflammatory glandular swellings.

Chopra *et al.* (1969) state that the seeds yield substances toxic to *Xenopus* larvae.

Euphorbia thymifolia

Batris-gora (O, H, Lo): Occurs throughout India.

As there are numerous horizontally spreading branches of this plant, the term *Batris-gora*, i.e., 32 stems originating from one point has been applied to this plant.

The plant is made into a paste with the leaves of *Ban-Jasti-madhu* (*Scoparia dulcis*). The paste is given orally by the Lodhas to cattle when they stop mastication.

Jain and De reported that *S. dulcis* is applied in gout pains of cattle.

Chopra *et al.* (1956) report that the plant is stimulant, astringent and laxative.

Erycibe paniculata

Kari-lata (K): Occurs throughout India.

Jain and De report that the leaves and stem are boiled in water and the thick decoction is applied on sprains of cattle. The sprained parts are first cleaned with water.

Glossogyne bidens

Bir-Barangom (M, O, S): Occurs in the Gangetic plains and in peninsular India.

The Lodhas use the plant with fresh rhizome of *Haldi (Curcuma domestica)* as a paste to cure the wound in birds due to bites by jackal and jungle cats.

Jain and De have reported that the juice of the plant is considered to have a healing effect on fractured bones specially of cattle.

Jatropha gossypifolia

Lal-Gab-Jara (K, Lo): Naturalised throughout India.

The tribals of Mundari dialect like Munda, Oran, Ho, Lodha, etc , use the term *Jara* for those shrubs which have latex in the body.

According to Jain (1971), if a piece of the root is tied on a thread and is put around the neck of cattle, it is believed to cure their wounds.

In *Wealth of India* it is stated that the aqueous extract of the plant possesses insecticidal properties.

Luffa cylindrica

Phalla (B): Occurs throughout India in wild and also in cultivated forms.

Cattle suffering from dyspepsia are allowed to inhale the smoke of the fibrous dry mesocarp of the fruit.

In *Wealth of India* it is reported that in China the ripe fruit is used after burning and pulverising as a carminative and anthelmintic.

Lygodium japonicum

Kukri (H, Lo): Occurs in North India from Kashmir to Sikkim, Bhutan and in South India.

About 10 gm of roots are pounded with the seeds of *Kusum (Schleichera oleosa)*. The pounded mixture is applied by the Lodhas on septic wounds of cattle. Before using the mixture, the wound is washed with the decoction of *Amla (Emblica officinalis)* bark. The powder of the roots of *L. japonicum* is also prescribed orally twice daily.

Chopra *et al.* (1956) state nothing about such uses.

Semecarpus anacardium

Soso-daru (S, O, M, H, B, Lo): Occurs in the sub-Himalayan tract, ascending to the outer hills up to *c.* 1000 m in Assam, Khasi hills, Madhya Pradesh, Gujarat and in the forests of Tamil Nadu.

Any tree species is called as *Daru* by the tribals like Lodha, Oran, Munda, Ho, Bhumij and Santhals. The name of the plant is given by tribals as *Soso-Daru* and *Bhela Daru.*

The Lodha of Midnapore district of West Bengal, Kondh and Bhumij of Koraput district of Orissa use the tar-like oil extracted from the pericarp of the fruit to cure foot sores of the cattle.

In periods of scarcity when *Heteropogon contortus* is used as fodder, the barbed calus of the seed of the grass sometimes causes ulceration in the gums of cattle. The tar-like oil is also used to cure this.

Haines reported that the pericarp of the fruit gives one of the active constituents in the preparation used by mahouts in *Chobing* elephant feet.

Bressers (1951) reported that the Munda of Ranchi district, Bihar, use the seed in diseases of the feet in cattle.

Chopra *et al.* (1956) state that the oil is vesicant.

Smilax zeylanica

Ram-Datun (K, H, O): Occurs throughout India.

There is a common belief among the Adivasis that the stem of the plant was used by Lord Ramchandra as a toothbrush when he was in the jungle for 14 years. So the plant is called *Ram-Datun*

About 10 to 15 red roots of the plant, 20 to 30 leaves of *Gandhal* (*Paederia foetida*) and five to seven roots of *Kujri* (*Celastrus paniculatus*) are pounded together. The pounded mixture is prescribed orally with water twice daily to cure amoebiasis in cattle.

Chopra *et al.* (1956) state that the root is used in dysentery.

In *Wealth of India* it is reported that the root-decoction is given for sores, swelling and abscesses.

Solena heterophylla

Chengor (S, O), *Ban-Kundri* (H, B, Lo): Occurs in different parts of India.

The tuberous roots are made into a paste with the water of habul-babul and the paste is applied on sores of small pox in cattle.

Jain and De have reported the leaf juice is applied on cuts and bruises of cattle. They have also reported that the plant is kept hanging in front of herds of cattle to keep away evil spirits and diseases like malaria. Chopra *et al.* (1956) report nothing about the chemical properties of the tuber of the plant.

Soymida febrifuga

Rahara (B, Lo): Occurs in dry forest areas.

The decoction of the bark is mixed with *Kachra (Terminalia bellirica)* fruit and the mixture is prescribed orally in diarrhoea of cattle.

The Mundas use the mixture of the pounded old seeds of *Sal (Shorea robusta)* and boiled rice suspended in cold water, twice daily to cure loose motions, specially in goats. If there is no improvement, the 'Dhuna' (resin of *Shorea robusta*) is prescribed in next dose for definite cure.

The Lodhas prescribe the mixture of pounded seeds of *Centratherum anthelminticum*, honey and seeds of *Trachyspermum ammi* to the cattle when they stop mastication.

Chopra *et al.* (1956) report the uses of bark in dysentery and as febrifuge.

Streblus asper

Sukri-Saijaug (H, M, Lo), *Kakasa* (S, O): Occurs in the drier parts of India.

The term *Kakasa* indicates rough. The leaves of the plant are rough, that is possibly why the name has been given to this plant.

If the calf does not suck the milk from mother, the dorsal portion of the tongue of the calf is rubbed with this leaf and the leaves of *Kundari (Coccinia grandis)* are given orally. The Lodhas of West Bengal report that due to excess accumulation of blood in the veins below the tongue, the calf does not suck milk. This is a kind of disease which is called *Simla*. By rubbing the leaf on the tongue, the flow of blood starts and the disease in cured. This treatment is mechanical.

Jain and De have reported that the roots of *Carissa opaca* are given to cattle in *Simla* disease (tongue ejects out and gets swollen).

Thelypteris extensa

Sal-Dakuni (M): Occurs in the foothills of India.

As this fern has close association with Sal forest, that possibly explains the local name given to this fern.

Three to four black roots of the fern are put as amulet on the neck of the cattle to cure larval infection. When the juice

of this fern comes in contact with the skin, it has an irritating sensation like the one caused by chillies.

Woodfordia fruticosa

Icha-Baha (H, M, O, Lo), *Dhai-Phul* (K, B): Occurs throughout India.

The Lodhas apply the decoction of the leaves on sores and on ulcers of cattle. Possibly due to the high percentage of tannin in the leaves (12-20 per cent) the ulcer is cured.

Jain and De have reported that the crushed roots are given to cattle for rheumatism.

Chopra *et al.* (1956, 1969) have not reported anything about the leaves and roots. So a phytochemical study of leaves and roots of the plant may be used.

Acknowledgement

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26

AN ETHNOBOTANIC CONNECTION BETWEEN MUSHROOMS AND DOLMENS

K.S. Manilal[1]

ABSTRACT

A unique type of dolmens in the shape of mushrooms are found in several localities in Kerala. These structures, called umbrella, stones, are megalithic burial monuments made out of hard lateritic stone by the ancient people in 1000-500 B.C. The main feature of interest about these dolmens is considered here as their characteristic shape itself, which closely resembles that of some mushrooms like Psilocybe, Amanita, etc., several species of which contain hallucinogenic compounds. Some of the tribals who eat such mushrooms are found to worship them, hold them as possessing mysterious powers and properties and consider them as a means to communicate with their Deity and with the spirits of the dead.

It is suggested that it was their respect and fear towards these types of mushrooms which prompted the ancient people to construct the stone monuments in a similar shape for their departed leaders so that the tribes may expect to continue to receive their able leadership and guidance from beyond.

Some characteristic megalithic lateritic monuments in the form of large mushrooms are found in several localities in Kerala, such as Porculam, Kunnamkulam, Eyyal, Morayoor, Devikulam, Mayanaad, Tirur, etc. These structures are known as *Kudakkallu* or umbrella-stones (Krishnaswami, 1949; Rao, 1972). These are the burial structures constructed by ancient

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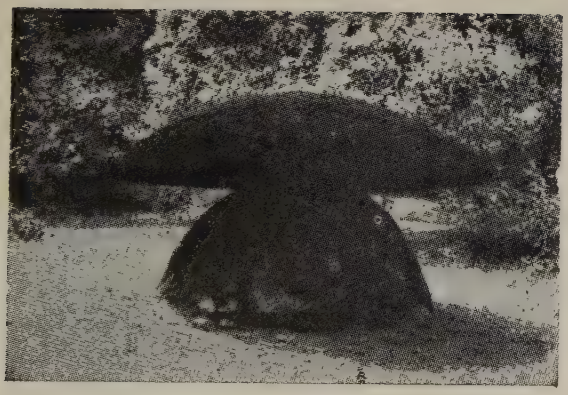
men in 1000-500 B.C. and belong to the type called dolmens. The dolmens, in general, are found along a long belt on earth, including such regions as southern and western Europe, northern Africa, central Asia and extending up to Malaysia. In India, dolmens are found mainly in Kerala. No conculusive evidence has yet been found to prove why the ancient people of such diverse cultures and far-apart regions of the earth were constructing identical types of monuments to bury their dead.

There are mainly three types of dolmens: (1) with a square chamber, covered on all four sides with flat stone pieces and with another flat stone piece for a roof, (2) with a square chamber as in the first type but with one side open, and (3) with a tapering conical pillar-like structure made of four stone pieces so as to make a circular outer side and another, circular stone with a flat bottom and a convex upper side as a roof piece. In the central chamber inside the dolmens, the ashes, bones and other mortal remains of the person are buried. Some of his belonging may also be kept. The last type of dolmen which looks exactly like a giant mushroom or an umbrella and is called the umbrella-stone is found in Kerala alone (Pl. 26).

The shape of the umbrella-stone megaliths is of particular interest. It is not known why this shape was preferred for the monuments, when countless numbers of designs for such a construction could be imagined. It could of course, be said that the geology of the region had a part to play in this, as it is sometimes found easir to cut circular pieces, rather than flat slabs, from laterite formations. In Kerala, which may geologically be divided into three main regions, viz., the coastal sandy region, the midland laterite region and the highland granite region, the umbrella-stones are mainly found in the midlands. However, many of them are found to be located in the coastal regions as well as in the highlands. Similarly , it is also evident that protecting the aehes and other remains of the dead from the vagaries of the climatc has not been the main aim because this could have been achieved more easily and with greater perfection using other types of simple designs. Strength of the structure could also not have been the primary concern of their builders, because evidently the roof piece in the umbrella-stone, placed at the pointed tip of the four-stone basal structure, is not planned for its stability. Therefore, it



26 An umbrella stone at Porculam (Kerala).

may be concluded that the most important feature in this type of dolmens has been the shape itself. This leads one to wonder whether there was any significance or speciality for this particular shape to capture the imagination of the ancient men.

The only common thing in nature with a similar shape are the mushrooms. Although there are many types of mushrooms, from the striking similarity in their external appearance it may be seen that the toadstools belonging to the genera such as *Psilocybe*, *Amanita*, etc., were the ones which were taken as the models for these dolmens. If this is so, these mushrooms would have had some special relations with those people who constructed the monuments. We have, at present, very limited knowledge about the philosophies on which the ancient men based their burial customs but, some strange beliefs and customs which are still existing among some tribals of Kerala (and, surprisingly, among some natives of southern Mexico) throw some light in this direction.

Modern chemistry has identified many chemical substances which, when consumed, are fatal to humans or affect the nervous system of men creating hallucination, unreasonable sense of happiness, etc. Most of the letter types of chemical compounds contain indole or are closely related to it. Important among such chemicals are Psilocybin, found to be present in *Psilocybe*, and L.S.D. (lysergic acid diethylamide) which is contained in another fungus called *Claviceps*. Several tribals in Kerala like Malapandarams, Paniyas, Kanikkars, etc., who eat such types of mushrooms are found to have a reverence towards them and a reluctance to talk about them. Malapandarams are known to make small dolmen-like structures for their worship on certain occasions. It has been recorded that the species of *Psilocybe* have for thousands of years been eaten by the native tribes of southern Mexico also as a community ritual and by their medicinemen to communicate with the deity (Christensen, 1966). The tribals who eat these mushrooms fear and adore them and regard them as the key to be in touch with infinity. Intake of these mushrooms in the ritualistic manner is believed to enable them to predict the future and to communicate with their dead leaders as well as relatives. Handling these mushrooms is considered a sacred matter and they can be talked of only in whispers among trusted friends, in the dead of night.

It is also believed that the eaters of these mushrooms attain super-human strength and an eternal life. Closer investigations about the role of these mushrooms in the rituals of the Kerala tribes may yield more interesting information.

Mushroom flora of Kerala, especially the species containing poisonous and hallucinogenic compounds, have not been subjected to any detailed study so far (cf: Purkayastha and Chandra, 1976). *Psilocybe tristis*, *Psilocybe caespitica*, *Amanita caesarea*, *Amanita vagenata*, etc., are already reported from other regions of India, as the edible forms. Evidently, some poisonous species of *Amanita* and *Psilocybe* are present in this region. Although the tribals who eat such mushrooms have a worshipful attitude towards them which are considered by the tribals as having mysterious powers and properties, no clear evidence for the existence of any religious rituals or ceremonies connected with the partaking of these mushrooms by these tribals could be obtained. However, it is strongly suspected that they have a superstitious reluctance to talk about this subject, which is similar with the beliefs of the South Mexican tribals.

It may, therefore, be stated that it was the respect and fear towards these types of mushrooms as a means for establishing a communion with their diety and for attaining an eternal life, which prompted the ancient people to construct the stone monuments for their heroic chieftains and rulers in this particular architectural design. By keeping the mortal remains of their brave leaders and warriors inside these mushroom-shaped monuments, the ancient people might have expected to continue to receive the leadership and guidance from their powerful ancestral spirits to win their own battles and solve their earthly problems.

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27

THE ROLE OF ETHNOBOTANY IN RELATION TO MEDICINAL PLANTS IN INDIA

N.C. Shah[1]

ABSTRACT

Ethnobotany is usually defined as anthropological approach to botany. There are several methods of ethnobotanical research and those relevant to medicinal plants are archaeological, search in literature, herbaria and the field studies.

The present article briefly deals with the methods of ethnobotanical research.

Emphasis is laid on urgency of field work because, with advancing civilisation; tribal cultures are fast dwindling.

Introduction

"Man, ever desirous of Knowledge, has already explored many things, but more and greater still remains concealed; perhaps reserved for far distant generations, who shall prosecute the examination of their creator's work in remote countries, and make many discoveries for the pleasure and convenience of life....."

The above quotation of Linneaus is the most appropriate introduction to this article which deals with the relationship between medicinal plants and the total filed of ethnobotany. The subject is vast and cannot be exhaustively dealt with here.

According to Schultes (1962), ethnobotany is "the study of the relationship which exists between people of primitive

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societies and their plant environment." In more simple words, it is an anthropological approach to botany.

In recent years, much work in this science has been done in the U.S.A., England, France, Mexico, India, etc. (Minnis, 1976).

The term is not new even to India, Kirtikar and Basu (1935) stated "The ancient Hindus should be given the credit for cultivating what is now called Ethnobotany."

Ethnobotany, in totality, is virtually a new field of research. And, if this field is investigated thoroughly and systematically, it will yield results of great value to the ethnologists, archaeologists, anthropologists, plant-geographers, ethnobotanists, botanists, linguists and ultimately to phytochemists and pharmacologists.

Faulks (1958) has discussed the questions or field of enquiry in detail. Usually, the following informations concerning the plants used by the ethnic or tribal people are collected by an ethnobotanist:

(a) Plants concerning domestic and wild animals: The plants used as veterinary medicines, food and fodder for the animals and to control the wild animals and pests by using plant poison, etc.

(b) Plants used as food—vegetable and fruits: cultivated as well as the wild ones.

(c) Plants used as fats and oil, flavour and condiments

(d) Plants of drinks, beverage, fumitories

(e) Household equipments and furniture: The plants which provide shelter and protection, furniture, floor coverings, wall carvings, field tools, water mills, etc.

(f) Plants that provide fuel and manure

(g) Plants that provide clothing, body cover

(h) Plants used as cosmetics

(i) Plants used for packaging material and cordage

(j) Plants associated with recreation and instruments: The plants used for making articles of play, walking sticks, toys, musical instruments, etc.

(k) Trade: The plants extracted from the forests for trade purpose such as medicinal, timber and grass, etc.

(l) Plants which are related to medicine, charms and hallucination, etc.

Besides these, the primitive ideas, thoughts and concepts, folklore stories or songs, abuses or blessings concerning the plants are also be recorded along with native names and phonetic transcriptions.

To collect such a vast information from the ethnic or tribal regions, requires both time and patience. And, this type of work cannot be fully accomplished without living for long periods in the area of study.

Few professional Indian botanists or ethnobotanists can get the facilities and privilege like Dr. Richard Evans Schultes, who spent an almost uninterrupted 12 years in the North West Amazon (Schultes, 1962), and published valuable work. A long stay in one region certainly enhances the chances of ethnobotanical discoveries through building up rapport with the natives, familiarity with their language, intimacy with the informers and intimate knowledge of the flora itself.

The important ethnobotanical works in India have been enumerated by Jain (1979).

Though ethnobotany provides several approaches in plant researches, here only the resources which help in medicinal are plant-research mentioned.

Archaeological resources

India has a rich treasure of archaeological sculptures of antiquity, which can be of great value in tracing the plants which were used during early civilisation.

Sithole (1976) described about 40 such plants from bas reliefs on the gateways of the Great Stupa at Sanchi and the railing of Bharhut Stupa, belonging to the first and second century B.C., respectively.

Archaeological sculptures can also help in recording the earliest dates of plant use, e.g., Sir J. Marshall in his book 'Buddhist Art of Gandhara' reproduces a picture where Lord Buddha is being presented with a bundle of herbs while a larger quantity is shown as the main present lying on the floor. Mahdihassan (1963) has identified this plant as *Ephedra* or 'Soma' of antiquity by examining the morphological similarities.

Literature resources

Our ancient literature can also be tapped for information on medicinal plants.

No authentic record of any kind except a few archaeological sculptures of Mohenjo-Daro is available from the prevedic period in this country. But, Rigveda and Atharvaveda, which date back to 2000 to 1000 B.C. which are our oldest Vedic literature resources, contain valuable information regarding medicinal plants of that period.

Wasson (1971) identified 'Soma' as *Amanita muscaria* he relied on the hymns of the Rigveda and according to him *Ephedra* was among one of the surrogates of 'Soma'. The Samhitas and Nighantus can also be used as valuable ethnobotanical resources. Recently, checklists of Ayurvedic and Yunani treatises have been published (Anonymous 1962a, b, and Tripathi *et al.* 1978). A list of some of the important Indian treatises is presented in Table 1.

Sharma (1968-69) enlisted 248 botanical drugs which are mentioned mainly in Atharvaveda and Rigveda. Singh and Chunekar (1972) published a glossary of such medicinal plants, which have been mentioned in Carak Samhita, Sushurta Samhita and Ashtanga Hridiyam. Sharma (1971, 1972 and 1973) reviewed the Nighantus and other treatises and listed the plants mentioned therein. Another source of literature are recent medico-botanical writings. The source is far more extensive and reliable; a few compilations worthy of mention are: Laszlo (1958) and Santapau (1958).

Perhaps the outstanding example, at least in modern times, of the use of the literature is the huge compilation of all antitumour plants, cited in old texts and local folk medicine from all over the world for screening purpose at Cancer Chemotherapy National Service Centre (CCNSC) (Hartwell, 1967-1971). In this survey, several thousand references embracing the whole history of medicine, pharmacology, materia medica, medicinal botany, ethnobotany and folklore were studied. The earliest of the literature studied was dated 2838 B.C. from Ebers Papyrus. A number of Indian treaties like Carak Samhita, Navanitakam (Bower's manuscript), Indian Medicinal Plants by Kirtikar and Basu and other literature were also used in this work.

Table 1.

Indian treatises	*Authors*	*Dates*	*No. of medicinal plants included*
1. Pre-Vedic period:		ca 3000-2000 B.C.	—
2. Vedic period: Rigveda & Atharvaveda		ca 2000-1000 B.C.	148
3. Post-Vedic period:			
Caraka Samhita	Caraka	100 A.D.	400-450
Bower's mss (Navanitakam)	?	350-375 A.D.	—
Sushruta Samhita	Sushruta	800-900 A.D.	573
Ashtanga Hridiyam Samhita	Vagbhatta	ca 700 A.D.	700-800
Ratnamala	Madhava	700 A.D.	—
Dravyaguna Sangrah	Chakrapani Dutt	1060 A.D.	—
Dhanwantri Nighantu	Mahendra Bhogick	?	373
Shodal Nighantu	Shodal	1200 A.D.	499
Madan Pal Nighantu	Madan Pal	1374 A.D.	—
Raj Nighantu	Narhari	1600 A.D.	750
Bhava Prakash Nighantu	Bhava Misra	1600 A.D.	—
Rajballabh Nighantu	Rajballabh	1760 A.D.	—
4. Modern period:			
Indian Medicinal Plants	Kirtikar and Basu	1935	1775
Glossary of Indian Medicinal Plants	Chopra *et al.*	1956	above 3500

Sometimes, ethnobotanical study of a single medicinal genus or species is undertaken by surveying various literature in relation to therapeutic uses and other uses, and examples of such work are: on *Nardostachys grandiflora* (Arora, 1965); on *Strychnos* (Bisset, 1974); on *Embelia ribes* (Shah and Kapoor, 1974), and on *Acorus calamus* (Shah, 1977).

Herbarium resources

Herbarium sheets and field notes have also proved to be a good source of ethnobotanical data. The most outstanding example of this type of research is of Dr. Altschul, who searched about 2.5 million plant specimens in Harvard University Herbarium and from these 5,178 useful notes of drugs and food value were recorded (Altschul, 1973)

In India, mention can be made of the work of Agarwal and Saha (1968) and Jain and Dam (1979).

Field resources

The plants have become the never-ending source for new biodynamic compounds of potential therapeutic value. Ethnobotanist brings out from the field the suggestion as to which raw plant material may be tapped, and for this, he gets clues from the tribals.

Though a considerable amount of work has been done on medico-botnaical survey, a brief review of the work is given by Shah (1979) but exclusive ethnobotanical researches on [medicinal plants are very scanty and sporadic. Mention can be made of the work of Atkinson (1882) in the Himalayas, Bodding (1925 and 1927) with the Santals; Jain (1963 and 1965) with the tribals of Baster (Madhya Pradesh), and Shah and Joshi (1971) for Kumaon region of India, etc.

Atkinson (1882) published 12 volumes of the Gazetteer of North West Provinces of India, three of which are concerned with the Kumaon and Garhwal Himalayan Region. Its first volume deals with ethnobiology, the second with economic botany and the last volume with the forest history, cultivation of tea, sericulture, etc. Bodding's work on tribal people of Santals (1925, 1927) was first bought to light by Jain and Tarafder (1970).

Recently, the Central Councils for Research in Ayurveda, Siddha and Yunani conducted several medico-botanical surveys in some important ethnic and tribal regions of the country.

It was found that the Nicobaris use the resinous wood of *Canarium* and *Dipterocarpus* spp. for repelling mosquitoes and as a torch. The fruits of *Ximenia americana* are used for intoxication purpose like toddy (Raghunathan, 1976a).

In the Nilgiris, six tribal communities namely Todas, Kotas, Irulas, Panias, Kurumbas and Kattunaykas were studied and about 93 useful plants recorded. The decoction of *Bambusa arundinacea* is used as an abortifacient (Raghunathan, 1976c).

In 1975, the author had an opportunity to visit Ladakh and stay there for three months, In Ladakh, people have their own system of medicine known as 'Amchi system'. It is actualiy the 'Tibetan system of medicine' that traces its origin to 'Ayurvedic system of medicine'. It was taken to Tibet in seventh A.D. from India.

The 'Herbal doctors' in Ladakh are known as 'Amchis'. They use quite a number of wild medicinal herbs comprising flowers, whole plant, roots etc. The medicinal herbs are usually collected by the 'Amchis' themselves from July to September when most of the plants are in flowering or fruiting stages (Pl. 27). After the collection, the plants are dried, powdered and then stored in leather bags.

About 80 medicinal species used by the Amchis and the local people were recorded. The herbs mostly used are: *Gentiana* and *Swertia* species, *Aconitum* sp. etc. (Raghunathan, 1976b).

Comparative study of tbe ethnobotanical resources

Ethnobotany becomes a more important and interesting subject when its study reaches a point when the results are studied compnratively. For example, *Ficus religiosa* and *F. racemosa* are among the most important sacred as well as medicinal plants of antiquity. These plants are depicted on several stealite seals discovered at Mohanjo-Daro, the ancient Harappan culture (ca. 3000-2000) and in the railing of Bharhut Stupa belonging to the first and second century B C.

A brief perusal of Vedic and other literature and the field ethnobotanical data on these plants have yielded some interesting findings.

Ficus in Vedic literature and among African tribes

In Atharvaveda, *Ficus racemosa* is attributed the property of increasing the number of domestic cattle, giving virility and strength of its wearer, add to the fertility of his land and growth of the fruits. It would give him wealth, prosperity and progeny, destroy his enemies and bring to him plenty of milk and grass (Griffith, 1917). It is interesting that of somewhat similar qualities in *Ficus* species are believed by African tribes. *Ficus capensis* and probably other species of *Ficus* are widely used among the tribes of Africa as a fertility charm to promote conception and the yield of crop. The Kikuyu tribe have used *Ficus* trees through generations as shrines or places of sacrifice. The Fulani tribe feed both fruit and leaf to produce an increase in the herd and to increase yield of milk. The Zulu tribe administer an infusion to increase the flow of milk (Watt, 1968; quoting Ferriera and Irvine).

Ficus religiosa in Carak Samhita and among Santal tribes

In Carak Samhita there are about 23 references of *Ficus religiosa* corresponding to medicinaland other properties. A few therapeutic uses described there are: in fever, in rheumatism, in urinary troubles, in spermatorrhoea, in pile, and in dysentery (Vidyalankar, 1959).

In the field study of Santals, Bodding had reported 16 therapeutic uses (Jain and Tarafder, 1970). These uses are similar to the uses as mentioned in Carak Samhita such as in fever, in spermatorrhoea, mucus in urine, in dysentery and in rheumatism.

India provides almost a virgin field for such a comparative study of literature and field resources. The ethnobotanical information contained in earlier literature can be compared with the information obtained from the field. This study might help in tracing the history and other information regarding medicinal plants. What is required urgently now is the ethnobotanical research particularly its field resources.

27 Amchi (herbal doctor) of Ladakh with some herbs.

Schultes (1963) rightly stated, "Our challenge is to salvage some of the modern medico-botanical lore before it becomes for ever entombed with the cultures that give it birth."

Before concluding, I will repeat the remarks of a foreigner, quoted by Kirtikar and Basu (1935). "The only way to illumine the whole field of native therapeutics is to survey it in small tracts and sift the value of those drugs peculiar to each province..... There is wide feeling that there is beneficience in the scheme of nature which provides in every country, suitable remedies on the spot for the ill to which humanity is locally most prone. Very little has been done so far to incorporate in the practice of physicians in the country the medicines which in India nature scatters broadcast from her lap."

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28

NATURE CONSERVATION IN KHASI FOLK BELIEFS AND TABOOS

P.K. Hajra[1]

ABSTRACT

The Khasis have a rich folklore about plants and their conservation. Their religious belief, that some deities reside in the forests, has resulted in the maintenance of certain undisturbed patches of forests as sacred groves, such as at Mawphlong and Sorarim near Shillong All biotic influences are excluded from such sacred forests.

The flora of sacred groves is very rich; many rare plants also survive due to protection.

Nature conservation can be best defined as the sensible use of plants, animals, the soil, water, air and other natural resources to accomplish the highest quality of living for mankind.

The world's limited natural resources are undergoing certain changes due to man's tendency to exploit them to meet his everexpanding necessities, and if proper measures are not taken to stabilised human population, the ecological balance will be lost. To study and solve this problem, various international bodies, e.g., International Union for Conservation of Nature and Natural Resources (IUCN), Man and Biosphere (MAB), and in India, the National Committee for Environmental Planning and Coordination (NCEPC), etc., have initiated many programmes.

1. Botanical Survey of India, Dehradun-248 195.

The present article deals with the religious beliefs of the Khasis—a tribal population of Meghalaya that helps in the preservation of forests in their natural condition. The religion of the Khasis may be described as spirit worship, or rather, the propitiation of spirits both good and evil on certain occasions, principally in times of trouble (Gurdon, 1975).

The Khasis possess rich folklore. In one of the famous folklores, i.e,. The Iei—Tree (The Dieng—Iei), it is mentioned that in olden days on the top of a hill near Shillong, there was a huge tree. The tree was cut down to remove the darkness of the land. When the tree was cut down, the land received light and cultivation was possible. Nobody knows what happened to the tree, for since the time it fell, the species has died out and there is no seed of it anywhere on the earth from which it can be grown (Gurdon).

The Khasis maintain sacred groves in many places in the Khasi Hills. They believe that their Sylvan deities live inside the sacred groves and they offer sacrifices to please these deities. It is a *sang* or taboo for a Khasi to cut any plant or kill animals inside these forests. They believe that the Sylvan deities would be offended if any one causes any damage to the plants and animals. There is a belief, for example, that a snake if killed, its dead body will give rise to generations of snakes, each one longer than the last until, one is eventually large enough to kill the culprit. Even the fallen branches and fruits are not collected from the forests for firewood or for consumption. The ancient nature of the sacred groves is emphasised by the outlying numerous tall monoliths erected in memory of the departed Khasi elders. The sacred groves of the Khasi Hills are a typical example of ecosystem conservation comparable with the UNESCO's (MAB) Biosphere Reserve Programme.

These sacred groves are natural treasure houses of plants and can satisfy the aesthetic, scientific, cultural and recreational needs of mankind.

There are many sacred groves in the Khasi Hills. The sacred grove at Mawphlong (Law Lyngdoh) and that near the Sorarim village are still preserved in a comparatively undisturbed condition. The groves near Shillong peak and Mawsmai villlage (Law Kyntang) are quite disturbed due to biotic factors.

These groves are situated in the folds on the hill-slopes and are surrounded by grasslands or pines.

The vegetation of the groves is subject only to climatic factors. The biotic factors are excluded. The dominant trees inside the forests are *Rhododendron arboreum*, *Pyrus pashia*, *Schima wallichii* var. *khasiana*, *Camellia kissi*, *Myrica esculenta*, *Quercus griffithii*, *Castanopsis kurzii*, etc. The shrub layer is represented by *Berberis wallichiana*, *Mahonia pycnophylla Lyonia ovalifolia*, *Agapetes obovata*, *Sarcandra glabra*, *Daphne bholua*, *Sarcococca saligna*, *Osbeckia stellata*, etc. The trunks and branches of the trees and shrubs are loaded with many ferns, orchids, lichens and mosses and other epiphytes The common ferns are *Dicranopteries linearis*, *Mecodium javanicum*, *Dryopteris paleacea*, *Lindsaea cultrata*, *Polypodium* spp., *Lycopodium* spp., etc. (Hajara, 1974).

Most of the sacred groves are saved from biotic factors like fire, grazing, lopping, felling, etc., because of the customs connected with the worship of Sylvan deities. It helps in the preservation of many rare plants like *Taxus baccata* with its two ranked flat leaves and solitary seed, borne in cup-like fleshy aril; *Botrychium lanuginosum* with grape-like globose sori; *Helicia nilagirica*, the only wild species of the family Proteaceae available in India; *Gnetum scandens*, climbing gymnosperm with broad leaves and pendant fruits; *Rauvolfia densiflora* with white flowers; and the endangered plant like *Anoectochilus sikkimensis*, a ground orchid with variegated leaves.

The primitive plants like *Exbucklandia populnea* with heart-shaped leaves and large ovate hood-like stipules; *Corylopsis himalayana* with golden yellow drooping catkin-like spikes and *Manglietia insignis* with large white flowers are common in the sacred groves. Saprophytic plants like *Epipogeum roseum* with pinkish white flowers; parasitic plants like *Balanophora dioica* with cone-like inflorescence; *Monotropa uniflora* with bluish-white solitary nodding flowers, *Mitrastemon yamamotei* with cup-shaped capsules are also preserved in these natural habitats.

The common ornamental plants inside the sacred groves are *Rhododendron arboreum* with large scarlet bouquets and *R. formosum* with white flowers. Many epiphytic orchids like

Pleione praecox with pink flowers; *Cymbidium elegans* with white to cream-coloured flowers; *Ottochilus fusca* with many white flowers; *Dendrobium hookerianum, D. chrysanthum* and *D. ochreatum* all with yellow flowers; *Coelogyne corymbosa* with white flowers; ground orchids like *Phaius tankervilliae* with purplish white flowers; *Spathoglottis pubescens* with yellow flowers; and *Paphiopedilum insigne*, a rare lady's slipper orchid, are available in the sacred groves.

However, in conclusion it may be mentioned that at present in many places in the Khasi Hills, the sacred groves are destroyed owing, no doubt, to the dilution in religious belief, etc. The Botanical Survey of India, in collaboration with the local forest department, took effective measures to protect these sacred groves form exploitation and the sacred grove near Mawphlong is fully protected from further damage. The following is a famous folklore of the Khasis translated by Bareh (1967):

"In ancient Khasi lore renowned,
A tree of wonderous size,
With majesty the Iei-peak crowned,
And branched across the skies.
And all the land around was fair,
And fertile was the ground;
And fairies danced, with graceful air,
The mystic tree around....."

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29

CUSTODIAN OF ETHNOBOTANICAL HERITAGE—A NEW ROLE FOR BOTANICAL GARDENS

S.K. Jain[1]

ABSTRACT

Some ethnobotanical heritage survives in near original form in remote forest areas or among unacculturated human societies. Economic, social and political factors are uprooting many such people from their native habitats, or from their traditional vocations.

This break in contact with original environment results in gradual loss of ethnobotanical knowledge. The ecology of both, the man and his plant surroundings is disturbed.

Wild edible plants and land races of crops get abondoned in fovour of new foods or varieties. Ex-situ conservation of species and races of ethnobotanical significance is a partial but immediate remedy.

With this objective, several years ago, a collection of germplasm of *Dioscorea, Manihot* etc. was organised in the Experimental Garden of BSI at Allahabad. Cultivation of ethnobotanically important species in special sections or making ethnobotanical or cultural trials or even display of plaques with ethnobotanical data on plants in the garden amounts to conservation of both material, and knowledge. Such cultural trial can have examples of plants in Indian epics, faith and tradition like species of *Ficus, Ocimum, Zizyphus, Aegle, Saraca, Santalum, Datura, Adansonia, Anthocephalus*, etc.

There is yet another important dimension.

Whereas resources for critical analysis, research and use of ethnobotanical knowledge are available more in institutions in developed

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countries, the ethnobotanical heritage is surviving more in underdeveloped or developing regions of the world. The Botanic gardens with ethnobotanical activities, therefore, play the new role of liaision and cooperation between tradition and concept on the one hand, and experimentation and utilization on the other.

Ethnobotanical information usually exists among surviving ethnic groups, particularly among technologically less advanced people of remote forest areas. This knowledge is a valuable heritage with us, and it is of great practical utility for us (Jain, 1987a).

The roots of all economic botany including medicobotany were in ethnobotany. Many present day widely exploited plant products owe their origin to ethnobotanical lores. *Ephedra* the source of ephedrine was known to the Chinese for curing respiratory diseases even before 16th Century. The Coco shrub now known for cocaine, an analgesic was known to early Persian Indians, who used it on long treks to remain free from hunger and thirst. The knowledge of Snake root, *Rauvolfia* to natives of India dated much before 18th Century. Products of Cannabis (source of hashish) and fleshy fungi have been known for hallucinogenic experiences since ancient times.

Another aspect of ethnobotanical heritage is the invisible significance of primitive agriculture. Traditional practices have been responsible for survival of much genetic diversity in plants of economic value.

Four factors, viz , acculturation, large scale adoption of improved crops, deforestation and mass dislocation of people from their native habitats are robbing the world of ethnobotanical heritage.

This is not the place to tell how much primary forest is being destroyed each hour of the day, and that the much publicized afforestation work often results in monoculture plantations, which are of little ethnobotanical value. The variety of plants which the people of any region used and the knowledge that passed from generation to generation gets lost. And with that goes the ethnobotanical heritage. Efforts to stop this loss are sometimes visible. Movements like

"Chipko Andolan" (Embrace the Trees) or "Save a Tree" etc. do have some impact, but the strong political or economic pressures are unlikely to save many natural forests and cultures from annihilation or serious transformation.

These pressures are depleting both, the natural plant cover and the knowledge of the folk about plants. Instances of depletion of ethnobotanical heritage are being brought to light from various regions.

One noticeable case in India is the situation among Santal tribals in eastern India. Bodding (1927) recorded over 377 plants and over 300 prescriptions based on single or compound drugs in Santal medicine. Studies made 50 years later found only part of that knowledge surviving. Many Santals had moved to cities for employment, and had forgotten the lore. The forest in Santal region had also suffered damage.

For continued survival of many biological species, ex-situ conservation is considered the only means and hope (Synge & Townsend, 1979; Jain, 1987b).

Many botanic gardens of the world already have sections on rare, endangered or andemic plants.

Ethnobotanical heritage is now a new area for attention; and gardens have to play this significant role of custodians of ethnobotanical heritage.

The objective would be to have in the garden, specimens of as many ethnobotanically significant species as possible Special attention will have to be given to labels or plaques with ethnobotanical notes and to ledgers on each species.

In India, from ancient times there was tradition of cultivating medicinal herbs around Ashrams or hermitages, i.e., the centres of spirituality and learning in forests. They were real ethnobotanical gardens, because the entire knowledge about properties of plants was in the form of oral tradition from teacher to disciple and generation to generation.

A recent case of such effort in India was the germplasm collection of the genera *Dioscorea* and *Manihot*, the source of staple food to many rural poor in South India, in the experimental garden of the Botanical Survey of India at Allahabad. Only a part of that collection now survives.

Botanical gardens in India have given some attention to this aspect and many plants of ethnobotanical significance in the genera *Aegle*, *Aristolochia*, *Asparagus*, *Citrus*, *Coelogyne*, *Crataeva*, *Curcuma*, *Datura*, *Dendrobium*, *Emblica*, *Ficus*, *Gnetum*, *Hedychium*, *Jasminum*, *Kalanchoe*, *Lycopodium*, *Mangifera*, *Murraya*, *Nepenthes*, *Ocimum*, *Paphiopadilum*, *Pholidota*, *Piper*, *Pterygota*, *Rauvolfia*, *Rhynchostylis*. *Ricinus*, *Rubia*, *Sansevieria*, *Santalum*, *Saraca*, *Smilax*, *Solanum*, *Tabernaemontana* and *Thevetia*, etc. are being grown in botanical gardens of Botanical Survey of India and other institutions.

Live plants of ethnobotanical interest are maintained in many institutions of Council of Scientific & Industrial Research, e.g. of *Costus*, *Ocimum*, and *Solanum* in Central Drug Research Institute, *Abrus*, *Argyreia*, *Calotropis*, *Centella*, *Coleus*, *Commiphora*, *Mucuna*, *Tylophora* and others in Central Institute of Medicinal & Aromatic Plants at Lucknow.

The Indian Council of Agricultural Research maintains ethnobotanically significant races of crops, e.g. in genera *Oryza*, *Triticum* and *Zea* in its various stations.

The National Botanical Research Institute, in its reorganisation plans, is developing ethnobotanical collections. Plants of significant ethnobotanical value already growing here include species of *Boswellia*, *Dillenia*, *Litsaea*, *Mimusops*, *Pterospermum* and *Santalum*. Methods of creating ethnobotanical collections.

Botanical gardens can perform the function of custodians of ethnobotanical heritage by one or a combination of the following methods:

1. Creating a collections of significant plants related to folklore of a particular ethnic group. While working among Gonds of Central India, the author created an ethnobotanical collection at Allahabad. This helped in precise identification and more material available for descriptions, illustrations, and study and display. A similar effort was made for the Mikir tribe of Assam in Shillong Garden. Recently an Ethnobotanical Garden has been created in southern circle of Botanical Survey of India.

Another approach could be to grow ethnobotanically significant plants by usage, or, of a family or genus.

The U.S. National Arboretum at Washington maintains a

Dioscorides Garden on traditional herbs. The Missouri Botanic Garden at St. Louis has a Herb Garden.

2. Plants in some gardens are arranged phytogeographically. For example the general lay-out in the garden at Calcutta resembles a map of the world, with plants from India in centre, plants from the America and Africa to west; from Europe to northwest and from east Asia, and Australia to east.

Regional ethnobotanical collections can be created in these sections. Else, these existing plants can be utilized for display of ethnobotany of those regions by providing appropriate labels and legends.

Chronological beds of plant introduction into U.K. in the University Botanic Garden at Cambridge are of much ethnobotanical significance.

3. When space does not permit creation of special collections, two alternatives are available.

(a) One is to design an ethnobotanical trial through existing plants. The plants of ethnobotanical significance can be suitably labelled and a guided trial marked through the arboretum or wilderness area of the garden. Such trials do exists in some gardens.

(b) If the too scattered location of trees does not permit even marking a trial, individual plants can be provided with legends of ethnobotanical significance.

4. Many plants are significant from purely literary or mythological view point; e.g. plants referred in folksongs and proverbs, plants considered sacred for offering in worship, as symbols of Gods, totems or themselves object of worship.

In the Indian epic Ramayana, during his exile, Lord Rama accepted fruits of *Zizyphus mauritiana* from a woman of low castes his wife Sita was confined in Sri Lanka in a grove of *Saraca asoca* trees. The Baobab tree, *Adansonia digitata* (also considered as 'Kalpa vriksha') is considered sacred and worshipped for its benevolence; the Sacred Basil, *Ocimum sanctum* plants should be grown in all devout Hindu homes, the *Ficus* trees are symbols of immortality, and would not be cut or damaged at all. Many plants are associated with planets, saints and taboos. Such plants could be a source of particular attraction in botanic gardens.

A collection of plants which are of mythological significance is being developed in NBRI; it is hoped that suitable labels and some publicity of legends about these plants will spread the message of conservation.

Labels on plants should have code letters like C (for Cultural), D (Dwellings), F (Food), M (Medicine) and O (Others), showing chief relationship category(ies), and name (or code) of Ethnic group. Details have to go on Index Cards.

A question may be raised that if ethnobotanical plants are recommended to be conserved because those species or their habitats are threatened, then how would these collections be different from rare plant sections in gardens. In case of rare plants, the significance and emphasis is on rarity and danger of extinction of the species. An ethnobotanical species may not be rare, but the continuity of contact between this plant and man is threatened, by annihilation of plant or by removal of man from that association. The emphasis is on conservation not only of the plant but also on this natural relationship and knowledge about the plant.

It is an appeal to all managers of botanic gardens that in their future activities they also appreciate and adopt their new role as custodians of ethnobotanical heritage.

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30

STUDIES ON SACRED GROVES ALONG WESTERN GHATS IN MAHARASHTRA AND GOA: ROLE OF BELIEFS AND FOLKLORES

V.D. Vartak[1] & Madhav Gadgil[2]

ABSTRACT

Sacred groves are pockets of almost climax vegetation preserved on religious grounds. Several such pockets are located in remote tribal areas along the Western Ghats in India. These forests, are the true indicators of the type of vegetation that once existed here before the dawn of modern civilisation. Their existence is mostly due to certain taboos, strong beliefs, supplemented by mystic folklores.

Due to the advent of modern civilisation, life and culture of the aboriginals are gradually changing. Consequently many of the beliefs, folklores are being ignored and are likely to be forgotten in the near future. Some inconsiderate urban folk have already started exploiting these sacred forests.

The article presents some folklores and traditional beliefs about sacred groves recorded near Mangaon village situated in the hilly region of Poona District of Maharashtra State.

Introduction

India is a country of sacred deities, lakes, animals and plants. The practice of dedicating groves to deities is common in India. All forms of vegetation in such a sacred grove, includ-

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ing shrubs and climbers are supposed to be under the protection of the reigning deity of that grove, and the removal of even a small twig, is taboo (Vartak and Gadgil, 1973). This preservation of the entire vegetation in association with a deity is a phenomenon quite distinct from the preservation of isolated specimens of sacred tress such as *Peepal* (*Ficus religiosa*) or *Umbar* (*Ficus racemosa*) which are often preserved and worshipped even wihtout any association with any deity. The sacred groves harbour vegetation in its climax formation, and probably constitute the only representation of forest in near-virgin condition in the remote parts of Western Ghats. The border of such sacred groves tends to be distinct, even when surrounded by forests from all sides. The surrounded forest, suffering some interference, is likely to be different in composition, lacking the tree and liana specimens of truly magnificent proportions that characterise the grove. Sacred groves are the ancient natural sanctuaries where all forms of living creatures were afforded protection through the grace of some deity.

These deities are generally of an extremely primitive nature. The deities, often called Mother Goddess, are in fact in the form of unshaped stones smeared with red lead, lying under a tall tree or open to the sky. For the believers, these deities namely *Kalkai*, *Shirkai*, *Waghjai*, etc., are extremely fearsome and breaking even a dead wood in a sacred grove may result in a serious illness or in violent death. Such strict taboos have led to the preservation in these sacred groves of forests in their virgin form, relics of the forest that must have once covered much of Peninsular India.

This phenomenon of belief in sacred groves is ancient. In fact, the nature of religious cults associated with the sacred groves, suggests that these cults date back to the hunting age, before man had settled down to raise the livestock or till the land. Sacred groves are always situated at a distance from any human settlement, which suggests their origin in the nomadic stage of society. The deities generally lie open to the sky and are known in many cases to be offended if a shelter was erected over them. Sacred groves are one of the most valuable of such legacies from amongst the primitive practices of natural conservation. The composition of the vegetation corresponding

to the climax formation for that region, corroborates the supposition that the groves have been immune to human interferences for a very long period of time.

These sacred groves may range in size from a group of few trees to a forest of trees spaced over as much as twenty hectares of land. Even the smallest groves often harbour some old and magnificent specimens of trees and climbers. The larger groves are a veritable treasure-trove for the naturalists, supporting many species of plants which are rare in the area and are becoming rarer with the deforestation. These sacred groves often serve as a last refuge for arboreal birds and mammals especially monkeys, and no doubt for other forest-loving animals as well.

Area of study

The area under study includes the hill region of western Maharashtra and Goa, located between 14° 49′-20° 0.5′ N and 73° 0′-75° 10′ E. constituting an area of about 20,000 sq km, i.e., about one-fifth of the gross of Maharashtra.

There are about 15 ethnically different clans located in various tribal zones in the remote forest areas of the Western Ghats. These clans or tribes show a specific culture of their own and are on various stages of adaptations from living a totally nomadic life to partial domestic environs in forest villages.

Plan of work

While visiting various parts of jungle from the Western Ghats during our botanical explorations, we have so far registered more than 180 sacred groves protected on religious grounds. For our critical ethnobotnical studies we have selected two sacred groves near Mangaon and Dapsare from the Panshet catchment area of the Poona District, Maharashtra State (Gadgil and Vartak, 1975).

While procuring the ethnobotanical information from the area, special efforts were made to record folklores and beliefs on various aspects of tribal life (Jain, 1963). The article presents some folklores relevant to sacred groves occurring in the remote jungles near Mangaon and Dapsare.

This area lies at the border of Welhe and Mulsi Talukas of Pune District at 18° 25′ N and 73° 25′ E. A river locally known as Mula originates at Dapsare and runs eastwards. It is dammed

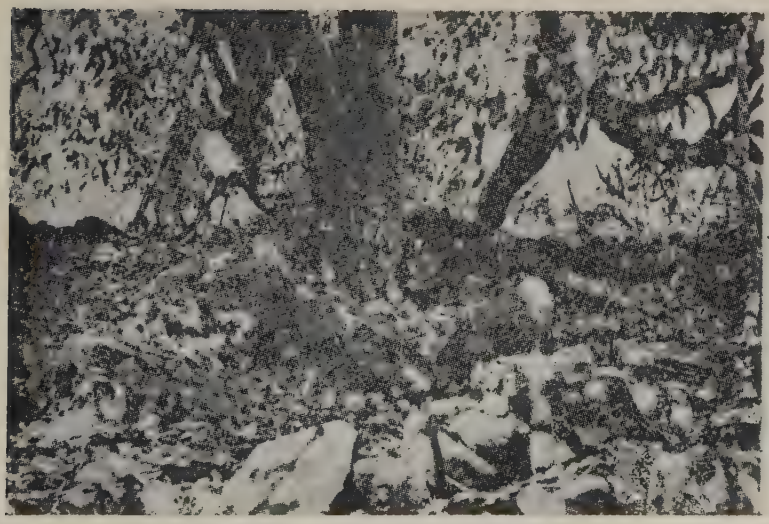
at Panshet. This has resulted in the formation of an extensive lake in the valley, flanked on either side by hills which rise to 500 metres. The hill slopes are dotted by villages with populations ranging from 100 to 400. The villagers cultivate paddy on the flat lands in the valley, most of which is now submerged under the reservoir. However, shifting cultivation on the hill slopes is still in vogue. The hill slopes which are fairly remote from the villages are still covered by forest. Until about twenty years ago, the whole region was better forested, particularly because the peasants left the valuable trees standing even when they cleared a plot for cultivation. The most notable amongst these preserved trees was *Hirda (Terminalia chebula)* whose nut is in great demand in the tanning industry. However, all these trees on the land owned by shifting cultivators, as well as the forest were cut down during the decade 1950-60; most of the land in this region is now entirely barren and heavily eroded. Outside the reserved forests in the more remote hill regions, the trees left around the settlement and the sacred groves are the only arboreal vegetation. Even these are suffering from continuous encroachment by cultivators as the productivity of their eroded fields is declining.

The sacred grove near Mangaon (Pl. 30.1) is considered to be the abode of Mother Goddess *Kalkai*. The image of the deities are uniconic and mostly exist in the open. Any misguided worshipper providing shelter to the Mother Goddess is supposed to be disliked by the forest spirits and presumed to be liable for severe punishment. The cults are often associated with ancestor worship (Gadgil and Vartak, 1976). Small round stones representing ancestors are generally placed by the side of deities (Pl. 30.2)

Role of folklore

Folklores play an important role in confirming such beliefs. Though most of the tribal population is ignorant about the art of writing and reading, they have scrupulously preserved their traditional costoms, rituals, ceremonies and a way of forest life through folklores which often suggests do's; dont's, conventional norms in everyday life and in the society and how to behave with nature under various circumstances.

30 1 Sacred grove at Mangaon.



30.2 Protecting deities in a grove.

The folklores also point rewards and blessings for good behaviour or act, and heavy punishment for the atheist or infidel. We have recorded several such folklores depicting various facets of life and culture of the aboriginals. Some of these folklores relevant to sacred groves are as follows:

To be placated, the deities generally demand animal sacrifices and stories of even human sacrifices like the Manvat incident are still recurrent. The cult spots are rarely within a village, but lie at a distance of at least 0.5 km in all cases. As Kosambi (1962) discusses, these features of the cults mark them as primitive, dating from the hunting and gathering stage of society. As against this, the villages are inhabited by milder male Gods like *Maruti* who live tamely in a temple and are happy with the offering of a coconut.

The smearing of the Goodess with red lead represents the blood of sacrificial victims. These victims were no doubt humans in bygone times. Even today, the Goddess *Shirkai* from the neighbouring grove in Pune District is *symbolically* offered a human victim every year.

Originally, the victim must have been sacrificed by being impaled on a hook which was hung on a rope from a rotating pole. Now the hook is still pressed against the back of the victim. But the man is no longer swung by the hook. Instead he is tied to the rotating pole by a dhoti. The wound made by the hook is not very deep and gets rapidly healed. *Shirkai* has a fine grove of four hectares in which this hook-swinging ceremony is performed. The original function of the groves was perhaps to provide the proper atmosphere for such primitive rites. There are innumerable stories about human sacrifices offered to the Goddess in the past. At present, however, this custom is substituted by slaughtering a number of cattle and fowl.

There are a number of folklores on repraisal of forest spirits for unauthorised hunting in the sacred groves, e.g., in the Dapsare grove, while a man was trying to smoke out a *Varanus* lizard from a hole in a tree trunk, the tree caught fire accidently and the *Varanus* disappeared. The person fell violently ill and escaped death by placating the deity with the sacrifice of a goat.

Removal of any plant material, even of dead wood, from the grove is taboo. The villagers seem to respect this taboo with

near-complete sincerity even today. Wood from the grove was however occasionally removed in the past with special permission from the deity in case of a disaster such as a major fire in the village. Apart from such, persumably very rare violations, the grove remained in a completely primaeval condition till 1948. In that year there was a dispute regarding the ownership of the grove between two clans in the village. The dispute was settled by the Government by the entire grove being auctioned for felling. A coal merchant from Pune bought the grove in the auction and commenced felling with the help of imported tribal *Katkari* labourers.

The villagers, who were at first unhappy about the destruction of their sacred grove, decided that they should at least make some money if destruction was inevitable. They also felt that it was the merchant who will be subjected to the wrath of the Goddess. They therefore refused to let the *Katkaris* do the felling and volunteered to do the felling themselves but on wages higher than those demanded by the *Katkaris*. This dispute lasted for quite a while, but finally, the merchant gave in and the villagers completed about five hectares of felling. At this point there was a further dispute which was terminated with the merchant dying a sudden death, vomiting blood. The villagers decided that the death was a just punishment meted out by the Goddess of the violation of her sacred grove.

Felling was stopped, and the rest of this magnificent grove was saved from disaster. Today the rest of the region has been completely deforested and the grove of Janni stands as the last refuge of the magnificent vegetation that covered the entire region till only twenty years ago.

We have heard a number of similar stories narrated by local people. Once a worshipper from Dapsare decided to construct a temple for the God. It was said that the forest spirit would not tolerate that the wood for the temple was being procured by felling a tree within the sacred grove. The worshipper nevertheless decided to take a chance and started felling a *Jambul (Syzygium cumini)* tree for timber. The tree came down much before it was expected and instantaneously killed all the three woodcutters.

Conclusion

Most of the folklores and belief of the tribal culture have some relevance with the past history of the community and its environs. Such beliefs and taboos have kept our sacred groves unmolested till now. Due to the advent of modern civilisation these beliefs and taboos are becoming weaker day by day and are likely to be forgotten in the near future. Recording the tribal culture by using modern techniques has thus become imperative.

Acknowledgement

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NOTES ON NOMENCLATURE

The names in left column are as given at most places and those in right column (After the sign =) are the names as now accepted for these plants. (as per S.S.R. Bennet's book on Name Changes, 1987).

Adhatoda zeylanica	= *Justicia adhatoda* L.
Adina cordifolia	= *Haldina cordifolia* (Roxb.) Ridsdale
Aesandra butyracea	= *Diploknema butyracea* (Roxb.) Lam
Alpinia malaccensis	= *Catimbium malaccense* (Burm. f.) Holttum
Amaranthus polygamus	= *A. graecizans* L. ssp. *thellungianus* (Nevski) Gusev
Aneilema divergens	= *Murdannia divergens* (Cl.) Bruck.
Aphania rubra	= *Lepisanthes senegalensis* (Poir.) Leen.
Asteracantha longifolia	= *Hygrophila auriculata* (Schum.) Heine
Bonnaya reptans	= *Lindernia ruellioides* (Colsm.) Pennell
Canna indica	= *C. coccinea* Mill.
Casearia tomentosa	= *C. elliptica* Willd.
Ceropegia tuberosa	= *C. candelabrum* L. ssp. *tuberosa* (Roxb.) Huber
Citrus medica var. limetta	= *C. limetta* Risso
Coleus forskohlii	= *C. barbatus* (Andr.) Benth.
Combretum decandrum	= *C. roxburghii* Spreng.

Cordia wallichii	= *C. obliqua* var. *wallichii* (G. Don.) Cl.
Cymbidium elegans	= *C. longifolium* Don
Dendrobium macrei	= *Flickingeria macrei* (Lindl.) Bennet
Dichopsis polyantha	= *Palaquium polyantha* (Wall.) Baillon
Digiteria cruciata var. esculenta	= *D. compacta* (R. & S.) Veld.
Diospyros tomentosa	= *D. exsculpta* Buch.-Ham.
Garcinia paniculata	= *G. sopsopia* (Buch.-Ham.) Mabb.
Gelonium multiflorum	= *Suregada multiflora* (Juss.) Bail.
Gentiana tenella	= *Gentianella pedunculata* (Don.) H. Sm.
Gironniera cuspidata	= *Aphananthe cuspidata* (Bl.) Planch.
Globba bulbifera	= *G. marantina* L.
Gynura cusimbua	= *G. bicolor* (Roxb. ex. Willd.) DC.
Haematocarpus thomsonii	= *H. validus* (Miers) Bakh. f. ex Forman
Heptapleurum hypoleucum	= *Schefflera hypoleucem* (Kurz) Harms
Hodgsonia hetericlita	= *H. macrocarpa* (Bl.) Cogn.
Holostemma annulare	= *H. ada-kodien* J.A. Schultes
Hydrocotyle rotundifolia	= *H. sibthorpioides* Lamk.
Ipomoea campanulata	= *Stictocardia campanulata* (L.) Merr.

Lactuca gracilis	=	*Ixeris gracilis* (DC.) Stebb.
Lantana aculeata	=	*L. camara* var. *aculeata* (L.) Mold.
Leea crispa	=	*L. asiatica* (L.) Rids.
Leucas aspera	=	*L. plukenetii* (Roth) Spr.
Leucas lavendulaefolia	=	*L. indica* (L.) R. Br. ex Vatke
Litsea Kingii	=	*L. cubeba* (Lour.) Pers.
Litsea wightiana	=	*L. floribunda* (Bl.) Gamble
Luffa cylindrica	=	*L. aegyptiaca* Mill.
Macrotomia benthami	=	*Arnebia benthamii* (Wall. ex G. Don) Johnston
Manglietia insignis	=	*Magnolia insignis* Wall.
Micromelum integerrimum	=	*M. minutum* (Forst f.) W. & A.
Milletia auriculata	=	*M. extensa* (Benth.) Baker
Morinda coreia	=	*M. pubescens* Sm.
Musa superba	=	*Ensete Superbum* (Roxb.) Cheesm.
Myristica kingii	=	*Horsfieldia kingii* (Hk. f.) Warb.
Nasturtium officinale	=	*Rorippa nasturtium-aquaticum* (L) Hayek
Oldenlandia	=	Some authors treat its species under *Hedyotis*
Oxalis corymbosa	=	*O. debilis* H.B.K. var. *corymbosa* (DC.) Lourt.
Oxalis martiana	=	*O. debilis* var. *corymbosa*
Panax fruticosum	=	*Polyscias fruticosa* (L.) Harms
Pandanus odoratissimus	=	*P. fascicularis* Lamk.
Panicum miliare (non Linn.)	=	*P. sumatrense* Roth ex R. & S.
Parkia roxburghii	=	*P. timoriana* (A. DC.) Merr.
Perilla ocimoides	=	*P. frutescens* (L.) Britt.

Phaseolus	= Some authors now treat its species under *Vigna*
Phlogacanthus thyrsiflorus	= *P. thyrsiformis* (Hardw.) Mabb.
Piper attenuatum	= *P. trioicum* Roxb.
Polygonum alatum	= *P. nepalense* Meissn.
Putranjiva	= Some authors treat its species under *Drypetes*
Quercus	= Some authors treat its species under *Lithocarpus*
Randia	= Some species now treated under *Catunaregam*
Rhus cotinu	= *Cotinus coggygria* Scop.
Saccolagium praemorsum	= *Acampe praemorsa* (Roxb.) Blatt. & Mc Cann
Sesamum indicum	= *S. orientale* L.
Setaria pallide-fusea	= *S. pumila* (Poir.) R. & S.
Smilax macrophylla	= *S. ovalifolia* Roxb.
Smilax prolifera	= *S. perfoliata* Lour.
Solanum crassipetalum	= *Lycianthes laevis* ssp. *crassipetala* (Wall.) Deb
Solanum verbascifolium	= *S. erianthum* Don
Solena heterophylla	= *S. amplexicaulis* (Lamk.) Gandhi
Spatholobus parviflorus	= *Butea parviflora* Roxb.
Sphaeranthus indicus	= *S. senegalensis* DC.
Tacca pinnatifida	= *T. leontopetaloides* (L.) Kuntze
Tenagocharis latifolia	= *Butomopsis latifolia* (D. Don) Kunth
Thevetia peruviana	= *Cascabela thevetia* (L.) Lippold.

Thymus serpyllum (non L.)	= *T. linearis* Benth.
Trema amboinensis	= *T. tomentosa* (Roxb.) Hara
Trichosanthes bracteata	= *T. tricuspidata* Lour.
Urginea indica	= *Drimia indica* (Roxb.) Jessop.
Vaccinium donnianum	= *V. sprengelii* (G. Don) Sleum.
Vaccinium serratum	= *V. vacciniaceum* (Roxb.) Sleum.
Ventilago calyculata	= *V. denticulata* Willd.
Viola serpens	= *V. pilosa* Bl.
Vitis	= Many species treated under *Ampelocissus*, *Cissus*, *Tetrastigma*
Wattakaka volubilis	= *Dregea volubilis* (L. f.) Benth. ex Hk. f.
Wedelia biflora	= *Wollastonia biflora* (L.) DC. var. biflora.
Wrightia tomentosa	= *W. arborea* (Dennst) Mabb.
Xeromphis spinosa	= *Catunaregam spinosa* (Thunb.) Tiruv.
Zanthoxylum budrunga	= *Z. rhetsa* (Roxb.) DC.

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